

## COMPOSITIONAL TECHNIQUES IN THE MUSIC OF TRISTAN MURAIL

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### INTRODUCTION<sup>91</sup>

Spectral music is inspired or determined by the notion of the spectrum and its evolution in time. As a result, it can be understood through an aesthetics of continuity that emphasizes global structure, as well as a logarithmic organization and construction by mathematical functions. All of these characteristics are fed by an awareness of the relationship between conception and perception; spectral music incorporates psychoacoustic laws of perception and the knowledge of sound into the compositional process and the conception of the musical piece (Murail 1980, 1984, 2000; Grisey 1984).

The basic compositional principles or tools used to achieve this are process, interpolation, mathematical function, and techniques derived from electronic music. These are applied to the spectrum as a model. Possible techniques are the following transformations (or their retrogrades):

1. Transformation from the harmonic spectrum to noise (both relatively stable states) through intermediate unbalanced states;
2. Transformation from sound (a relatively defined state) to noise (a relatively complex state) through intermediate states;
3. Transformation from a harmonic to an inharmonic spectrum through interpolation.

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The spectrum as a model can be obtained through analysis of the frequency spectrum of recorded sound with the aid of a computer; this serves as the basis for instrumental additive synthesis. Additive synthesis is just one of the electronic music techniques metaphorically translated from the electronic to the acoustic domain. Other electronic techniques serving as models are: filtering, amplitude modulation, ring modulation, frequency modulation, distortion, and frequency shifting (frequency translation). Furthermore, timbre analysis of instruments may lead to insights towards a new orchestration technique (Grisey 2000).

## APPROACH

In discussing the various issues and principles mentioned above, we draw examples from the music of Tristan Murail. In this paper we will stay close to the original sketches and patches of Murail to explore his own working process as accurately as possible. Bearing in mind that some artistic choices can be traced more easily than others, we will discuss the discernible ones. The compositions discussed and their respective central techniques are presented in [Table 1]. (Unfortunately, entire analyses of these pieces would lead beyond the scope of the paper, and are therefore omitted.)

**Table 1. Works Analyzed**

Composition (Year)	Compositional Techniques
<i>Désintégrations</i> (1982-1983), for 17 musicians and tape	distortion model, static sound analysis, progressive distortion, additive synthesis
<i>L'Esprit des dunes</i> (1994), for 11 musicians and electronics	acoustic model, distortion, frequency shifting, additive synthesis
<i>Le Partage des eaux</i> (1995), for orchestra	acoustic model, vocoder technique

### *DÉSINTÉGRATIONS* (1982-1983)

*Désintégrations* is scored for 17 instruments and magnetic tape. It was composed after profound study of the notion of instrumental timbre. Spectra obtained after static computer analyses of sounds from piano, strings,

clarinet, flute, and trombone served as pitch models for both the computer-generated tape sound and the score for the 17 instrumentalists. Interestingly, the parameter of timbre, analyzed into hard computer data, thus determines a pitch model, the application of which serves a structural role throughout the piece. Each particular instrumental timbre places its signature on one or more sections (Anderson 1993, 1996). Furthermore, the fact that the data determine the materials of both magnetic tape and written score enhances the fusion between the instrumental world and that of sound synthesis. It is this very marriage of the electronic and the acoustic realms that became the hallmark of the music of Tristan Murail and still remains one of its most innovative aspects.

In Section 8 of *Désintégrations*, a defective (incomplete) harmonic spectrum with fundamental  $C\sharp_1$  [Example 3b] transforms during a progressive distortion process from harmonic to inharmonic. This process is modeled after the natural distortion present in the spectrum of the piano. Timbral analysis of the outer registers of the piano does not result in a harmonic spectrum, the higher partials revealing too high frequencies when compared to their respective harmonic reference value (the respective integer multiple of the fundamental frequency). This deviation appears to be a function of the involved partial rank. This observation leads to the following mathematical equation:

$$f(r) = f_0 * r^d$$

where:  $f(r)$  = the distorted frequency with partial rank  $r$ ;

$f_0$  = the fundamental frequency;

$r$  = the partial rank (an integer);

$d$  = the distortion coefficient, an indicator of the amount of distortion:

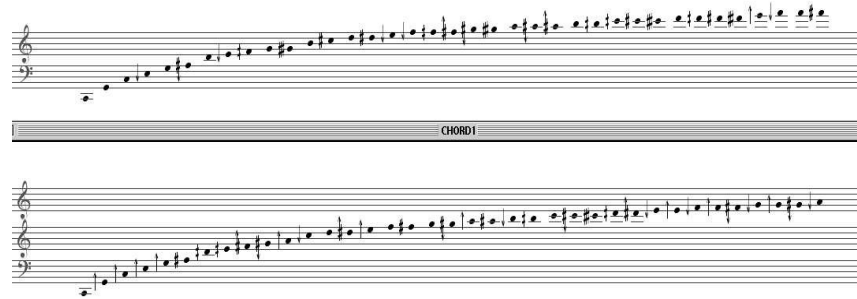
$d = 1 \Rightarrow$  no distortion;

$0 < d < 1 \Rightarrow$  the spectrum is compressed;

$d > 1 \Rightarrow$  the spectrum is stretched.

The distortion coefficient can be understood as a measurement for the amount of distortion involved. Sometimes the corresponding percentage is used instead. In case  $d = 1$ , there is no distortion and the equation becomes the harmonic equation where all frequencies are integer multiples of the fundamental:  $f(r) = f_0 * r$ . In case  $0 < d < 1$ , the spectrum is compressed; if  $d > 1$ , the spectrum is stretched. In the case of the recorded piano spectrum, the latter is the case. In [Example 1], this is displayed in staff notation. The

corresponding theoretical harmonic spectrum (with  $d = 1$ ) is calculated and put below as a reference.



**Example 1. Theoretical Harmonic (top) and Observed Distorted (bottom) Spectrum Containing only the Partial Present in the Analyzed Piano Sample.**

An OpenMusic patch was programmed in order to display the distortion deviation between the empirical and the harmonic frequencies in a graph [Example 2]. It should be noted that the distortion coefficient is not used as such to define the degree of distortion. Murail defines the distortion amount here as the deviation (in cents) of the distorted pitch of one particular reference partial in comparison to its corresponding theoretical harmonic value. In this way, he found a conceptual strategy for the progressive distortion process applicable to the material of *Désintégrations*.

At Rehearsal 8, a series of seven spectra is obtained by progressive distortion of a spectrum built on  $C\sharp_1$  [Example 3b]. Reference partials for the distortion process are the harmonics with rank 3 and 21. With every distortion step, they move a half step and a quarter-tone higher, respectively [Example 3a].

In [Example 4] (another sketch by the composer) the chord sequence is subjected to permutation, filtering, and complementation. The permutations simply lead to a different order of the chord sequence, while filtering in this context means omitting some of the partials. These modifications reveal how the distortion process is only used as a starting point. Its resulting chord sequence is subjected to the musical intuitions and aesthetic preferences of the composer.





At Rehearsal 10, the tape plays a filtered (i.e. incomplete) trombone spectrum on E<sub>1</sub> [Example 5b], while the trombone in the ensemble plays the second partial. Whenever the spectrum appears again, it is submitted to a progressive distortion process, the 12<sup>th</sup> partial moving a quarter-tone higher with every step, as can be observed in Murail's sketch of the distorted chord sequence in which the reference partial is indicated [Example 5a].



**Example 3a. Progressive Distortion of a Spectrum, with Reference Partial 3 and 21.**



**Example 3b. Theoretical Fundamental of the Distortion Spectra.**



**Example 4. Filtering, Permutation, and Complementation of the Material.**



**Example 5a. Progressive Distortion of a Trombone Spectrum, with Reference Partial 12.**

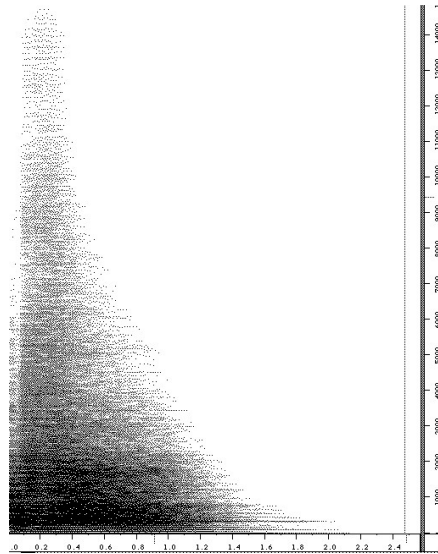


**Example 5b. Theoretical Fundamental of the Distortion Spectra.**

### *L'ESPRIT DES DUNES* (1994)

*L'Esprit des dunes* is scored for 11 instruments (two flutes, oboe, clarinet, horn, trombone, violin, viola, cello, double bass, and percussion) and MIDI keyboard. From *L'Esprit des dunes* onwards, the “acoustic model” has become an important basic principle of Murail’s compositional process. An acoustic model is obtained after dynamic sound analysis of a given sound and plays the role of musical object in the composition. This object is a perceptive category, a recognizable entity we can familiarize ourselves with and one which plays a structural role in our perception of the piece.

During the 1970s, at the very beginning of the computer application towards sound analysis, only static sound analysis was available, yielding information about one isolated moment of a recorded sound in time. This led to the application of static analytical results during the compositional process: early spectral compositions of Grisey and Murail used the static analyses of trombone samples and several other samples. With the development of computers in the 1980s and 1990s, dynamic sound analysis



#### Example 6. Sonogram of the Tibetan Horn Attack.

became available, modeling a spectrum as a function over time. This revealed hard facts about how sound evolves in time, while transcription into music notation led to the possible application of acoustic models during the compositional process.

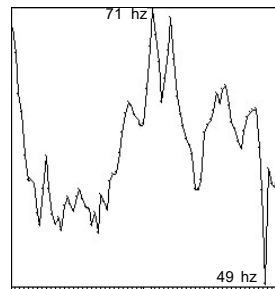
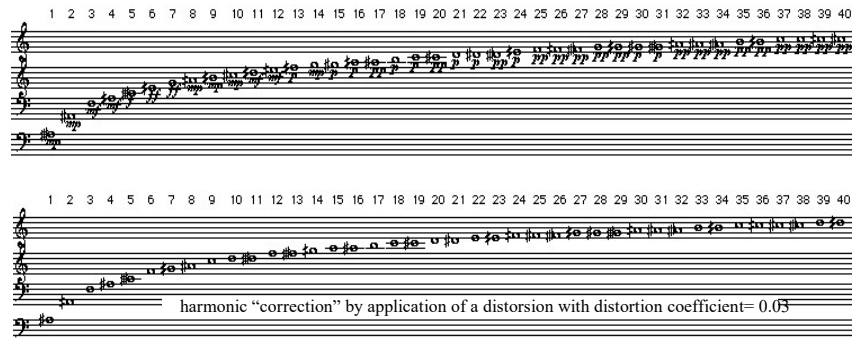
From *L'Esprit des dunes* onwards, another aspect that becomes very prominent in Murail's music is melody (Lalitte 2002). Murail is particularly interested in timbral melody, which he defines as “a fundamental with a melody evolving in the timbral field of that fundamental” (Murail 2002).

Murail uses three acoustic models obtained after sound analysis of, respectively:

1. Tibetan horn: a model for natural distortion;
2. Mongolian overtone singing: the timbral melody as the goal;
3. Tibetan monks' psalmody: rich timbral content without the internal melody as the goal.

The Tibetan horn sample used by Murail is characterized by a melodic movement from the first to the second and third partials, where the third partial (the fifth) is too low when compared to the pure harmonic fifth. This phenomenon, natural distortion, is used as a model. The attack is typical for a brass instrument: the attack has a gradual amplitude envelope (some time is needed during the attack for the amplitude to reach its maximum).

The spectrum of the Tibetan horn reveals a natural distortion. If a harmonic “correction” distortion with coefficient  $d = 1.03$  (see the equations above) is applied, we obtain a harmonic spectrum [Example 7a]. Note that the fundamental frequency of the Tibetan horn changes considerably during the time of attack [Example 7b].



evolution of the fundamental frequency

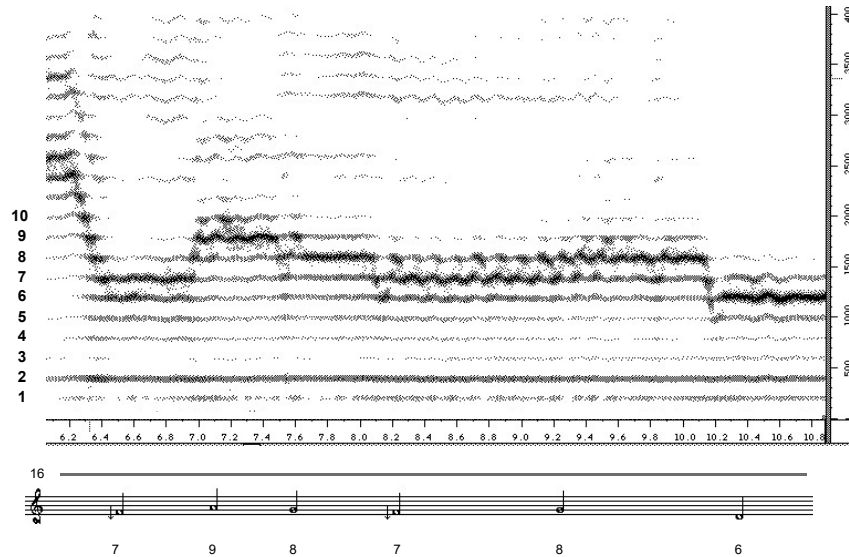
### Examples 7a and 7b. Spectrum of the Tibetan Horn and Evolution of its Fundamental Frequency during Attack Time.

The horn spectrum appears in the score in the following forms:

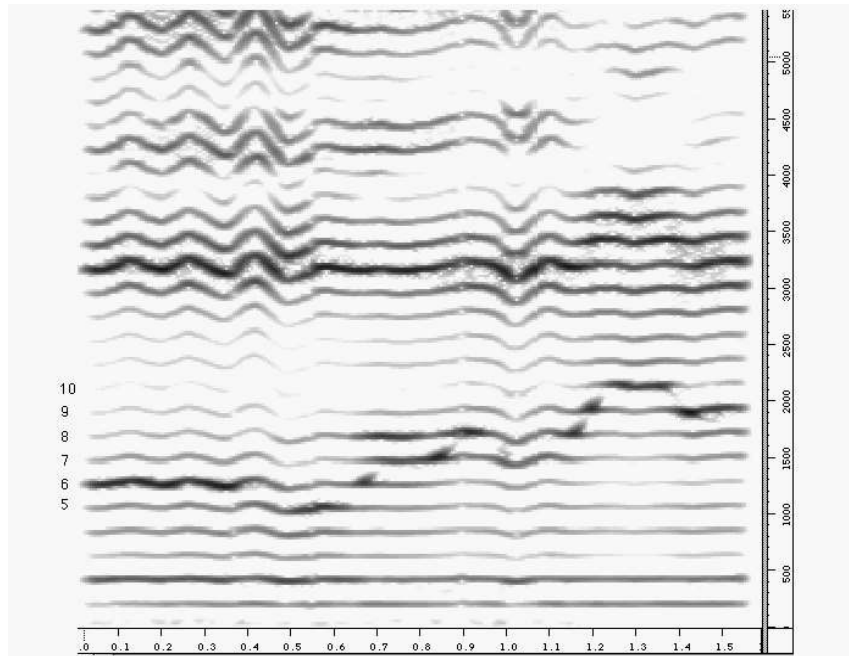
1. Orchestrated through instrumental additive synthesis;
2. Resynthesized by a sine wave oscillator bank (in Max/MSP);
3. Controller of frequencies and amplitudes in a filter bank (in Max/MSP).

Mongolian overtone singing is used to generate the introductory material of *L'Esprit des dunes*. The first sound sample was analyzed using “partial

tracking” by Additive software (now part of the Diphone package at the Institut de Recherche et Coordination Acoustique/Musique). After the composition was finished, Murail made sonograms of the samples with the aid of AudioSculpt software and transcribed them into staff notation for pedagogical purposes [Example 8]. It should be noted that the sonogram as representation of sound over time is in fact a kind of score in itself. The sonogram reveals that the timbral melody is diphonic, consisting of two independently moving shapes within one spectral field: one behaves as a drone at the second partial rank; the other Gestalt is a melody moving freely through the respective partials with rank 7, 9, 8, 7, 8, and 6. The sonogram reveals how all of these (and more) harmonics are present during the entire sound sample. At times, however, the partials that constitute the melody become significantly more prominent (by amplification through the vocal chord-throat-mouth instrument of the overtone singer) than the other harmonics. This means that they subsequently stand out from the harmonic field. And this subsequent sounding of pitches is a melody, by definition.



**Example 8. Sonogram and Transcription of Mongolian Overtone Singing (Sample 1).**

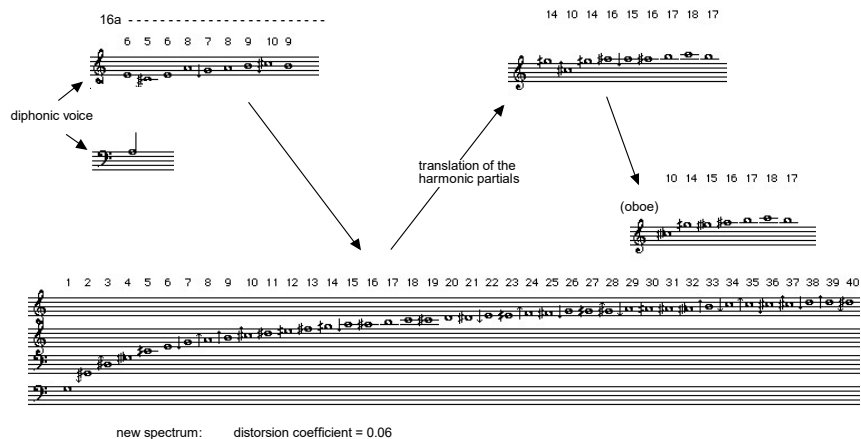


**Example 9. Sonogram of Mongolian Overtone Singing (Sample 2).**

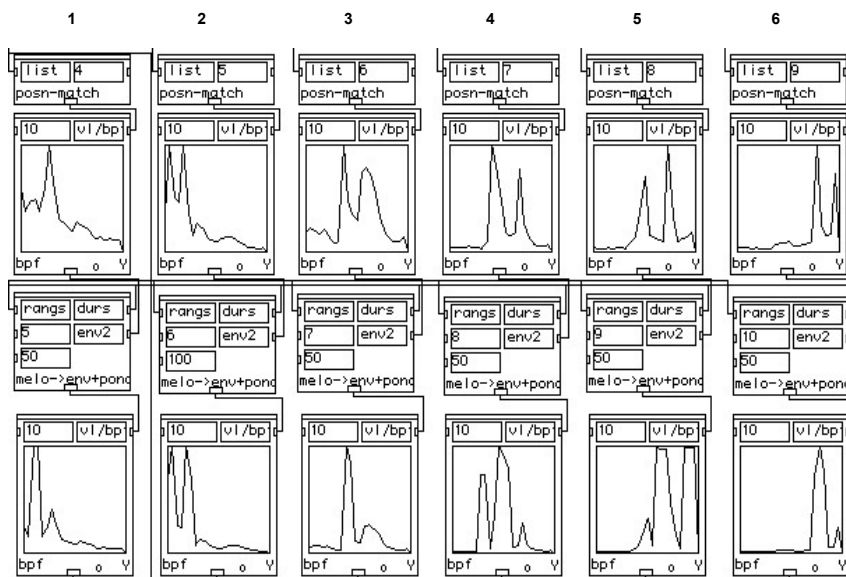
The material of the introduction to *L'Esprit des dunes* stems from Mongolian overtone sample 2. The corresponding sonogram analysis, performed in AudioSculpt, made the diphonic voice visible again [Example 9]. The melody can be characterized by the subsequent three patterns (two lower neighbor patterns and one upper neighbor) touching the following partials: 6-5-6, 7-8-7, and 9-10-9. The fact that this melody can be regarded as the subsequent sounding of patterns that are themselves also linked by neighboring relationships gives the melody a sequential appearance.

Murail filtered the sound sample in AudioSculpt in order to obtain the melody and its transcription into staff notation, again for pedagogical purposes. He distorted the original harmonic spectrum by six percent ( $d = 1.06$ ) and, through translation of the melodic pattern onto a higher region in this new spectral field, he obtained the “appel” (call) central to the piece. The Gestalt or contour of the melody remains [Example 10] and is played by the oboe at the very beginning of the piece. Murail omits the first pitch of the melody, probably to emphasize the upwards movement from partials 5 through 6, 7, and 8, thereby reducing the sequential nature of the melody.

The overtone melody was revised by redrawing breakpoint-functions in PatchWork software. The original melody can be viewed as a succession of



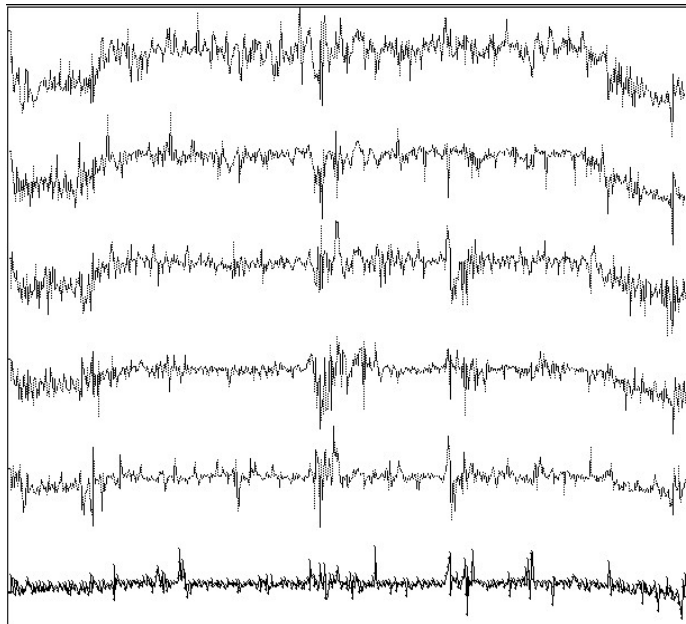
**Example 10. Several Pre-Compositional Stages Towards the Introduction Material.**



**Example 11. PatchWork Breakpoint Functions of Amplitude Envelopes, Partials 5-10: Original Breakpoint Functions (top); Construction of the Imaginary Sound (bottom).**



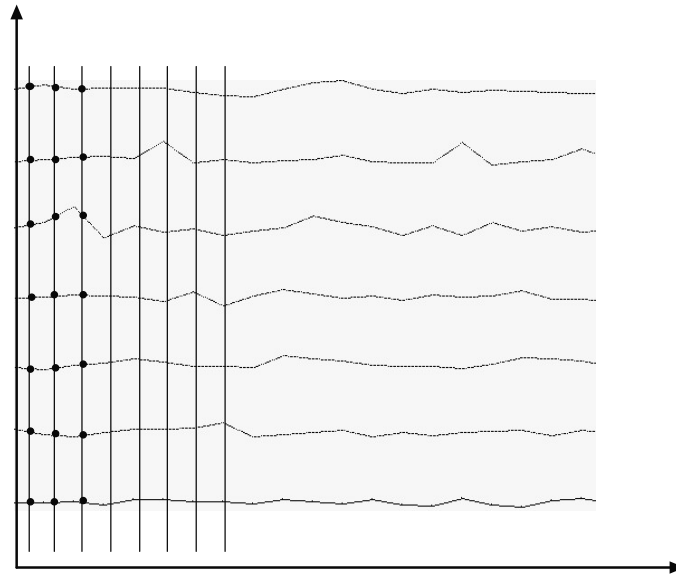
amplitude envelopes (breakpoint functions of amplitude over time) of partials 5 through 10, each peak indicating the occurrence of the respective pitch in time. The amplitude envelopes of the different partials were revised, thus constructing an imaginary sound [Example 11]. Generally, the overlaps between peaks were eliminated from the melody, and some of the peaks were actually moved in time by shifting the respective amplitude envelope along the time axis (i.e. horizontally). The resulting melody has a somewhat more defined shape; this particular process, applied to several different melodic patterns, was used for sound synthesis throughout the piece.



#### **Example 12. Tibetan Monks: Evolution of the Six Lowest Partial.**

The third material serving as the basis to an acoustic model is the Tibetan monks sound file. In this sample, the internal melody is not the goal of the singers, as it was with the Mongolian overtone singer, but a consequence of the interference of the chanting of the monks together, each one producing an especially rich (i.e. rich in partials) spectral field. A representation of the

evolution of the first six partials and their transcription into staff notation can be seen in [Examples 12 and 14]. The analysis by partial tracking [Example 13] consists of taking a snapshot of the sound every  $x$  milliseconds ( $10\text{ms} < x < 20\text{ms}$ ) and finding the position of the partials (their frequencies and amplitudes at that particular moment). The amount of time between two snapshots (i.e.  $x$ ) is also called the step or stepsize. During the analysis the sound is sliced into tiny, seemingly stationary, time-segments for which the frequencies and pitches are determined. These slices are called windows or window size. Usually the window size is larger than the step size, providing the windows to overlap, which greatly improves the quality of the analysis. The dynamic analysis is, in fact, obtained by putting very small windows over the sound, analyzing those supposedly static moments, and putting them together again afterwards. A transcription of the data into a chord sequence was obtained with the aid of PatchWork software [Example 14].



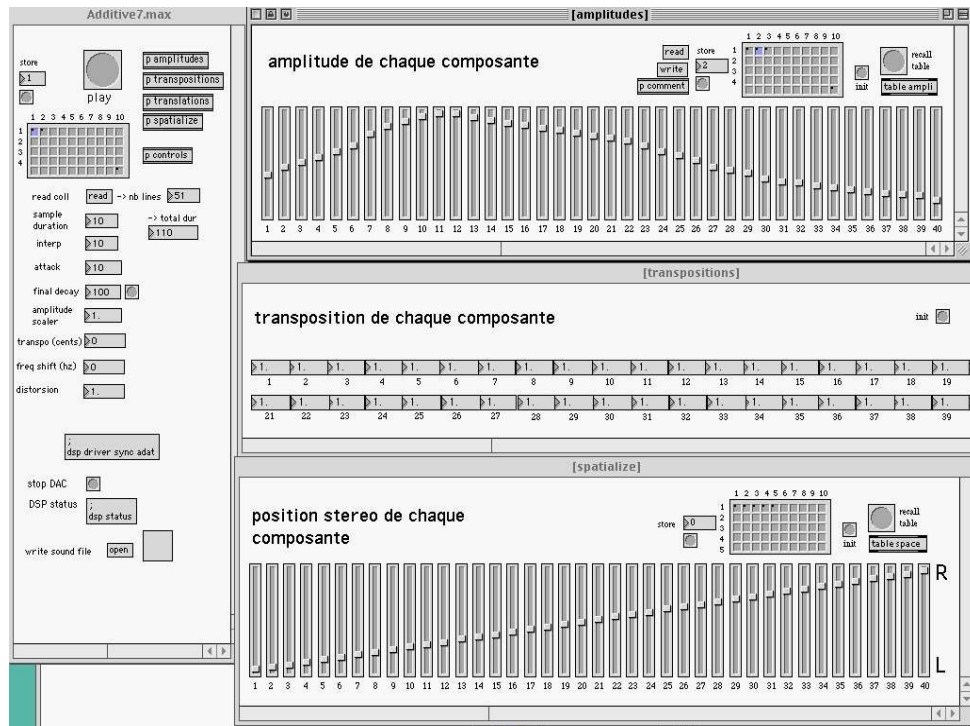
**Example 13. Partial Tracking.**

The Tibetan monks sound file is used for resynthesis and orchestration, both from Section B and, more clearly as a vocal entity, from Section D onwards.

début du son

milieu du son

Example 14. Tibetan Monks Sound Sample: Two Transcriptions into Staff Notation (Beginning and Middle).



### Example 15. Max/MSP Oscillator Bank Used for Resynthesis.

Murail used an oscillator bank consisting of 40 independent oscillators programmed in Max software controlling the IRCAM workstation as a resynthesis device [Example 15]. Nowadays, these kinds of oscillator banks would be programmed directly in Max/MSP. The 40 sine-oscillators are controlled by the analysis data from the sound samples, resynthesizing the latter through pure additive synthesis.

Furthermore, the analysis data stemming from all three sound samples (the Tibetan horn, the Tibetan monks' chant, and the Mongolian overtone singing) are used as filter controllers. Murail used a filter bank with 40 filters, also programmed in the software Max/MSP. The source input sound, usually a rich noise-like sound, is fed through 40 bandpass filters. For this purpose, Murail used the sound of torn paper cardboard, polystyrene blocks

rubbing against each other, and the naturally noisy granular sounds of the percussion instruments maracas and rain sticks. The frequency and response of each filter are controlled by the corresponding spectral data (frequencies and amplitudes of the partials over time) from the three other sounds. This elegant process is in fact the cross-synthesis between the noise on one side and the analyzed sounds on the other side.

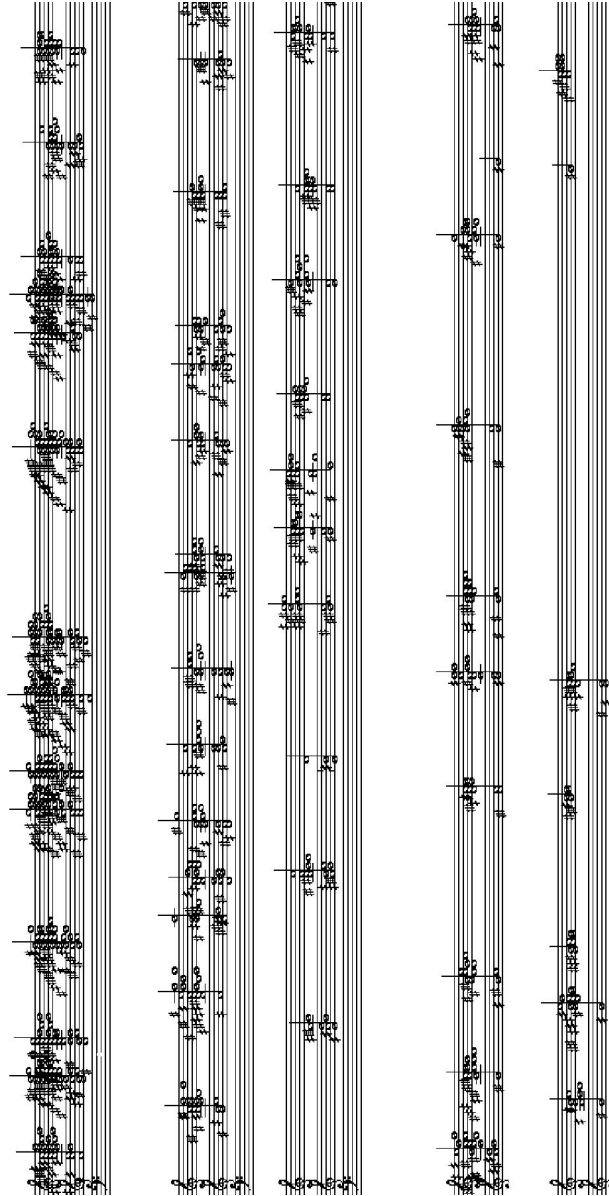
During the second half of the piece, Murail combines all the constituent materials. In order to avoid a clashing of overtones, and therefore to enhance the fusion of sounds, several processing techniques are used. For example, distortion of one material (the Tibetan monks) superimposed on the transposition of another (the Mongolian singer) results in a wonderfully fused sound.

### **LE PARTAGE DES EAUX (1995)**

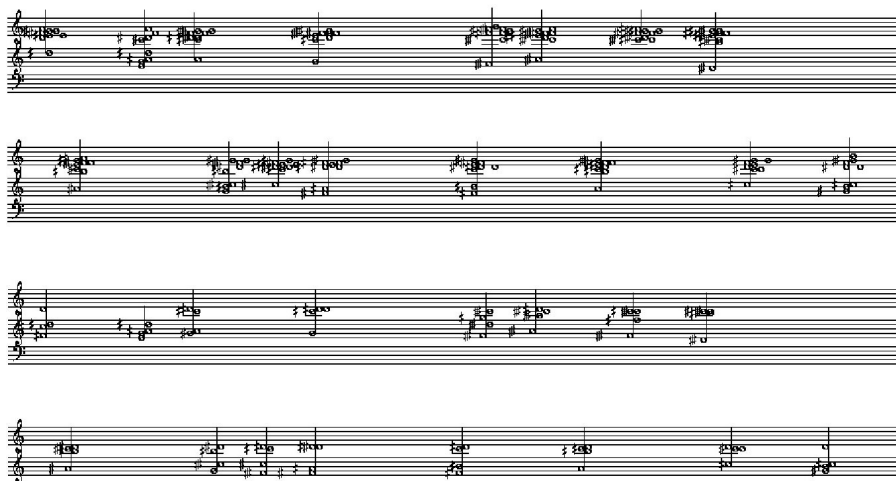
*Le Partage des eaux*, scored for large orchestra (containing four-fold woodwind and six horns), models complex natural sounds into orchestral structures. One imaginary sound, of stones and pebbles hitting on the shore, serves as a first call and a recurring signal in the piece, forming the basis of its structure. This signal is relatively short and contains clear attacks; it is of a percussive metal nature. Two other sound materials were recorded at the sea-shore and analyzed into their constituent frequency components with the help of PatchWork software. The resulting data were transcribed into musical notation by the same software. The three water-inspired sound materials differ from each other significantly and appear in the score in a structural way. *Le Partage des eaux* investigates reminiscence, the workings of memory, concerning itself with time. The three materials are easily distinguishable by the following characteristics:

1. First call (stones and pebbles hitting on the shore), clear attacks, percussive metal sound;
2. Infra chromatic wave “Risée” (a small wave, gurgling on the sand), a highly defined and recognizable sound object;
3. Breaking wave “Ressac” (a large wave breaking on the shore and receding), turning point, and chaos.

In [Example 16] the musical transcription of the Risée object is given. In the orchestration of the several frequency components, Murail closely follows their relative velocities (dynamics) obtained through analysis. [Example 17] shows a selection of the loudest pitches from the analysis of the Risée sound sample.



Example 16. Transcription of Sound File *Risée-8* into Music Notation.



**Example 17. Pitch Selection from *Risée-8*, Assigned to Flutes and Clarinets.**

These main (i.e. loudest) components of the sound masses (i.e. chords, evolving in time) are assigned to the four flutes and four clarinets. Murail makes them shape the skeleton or the backbone of the sound, a role they can fulfill because of their volume and the internal consonance of their timbres. This internal consonance is due to a relatively clean spectrum and lack of clashing overtones within the timbre of the instrument. Meanwhile, the agile strings add to the movement around this skeleton by forming fine textures of meticulously composed voices of timbral harmonic content.

The orchestration of Ressayre material on page 36 of the score is characterized by a sharp turning point played by the bongo to set off the wave breaking into a seemingly chaotic turbulent movement away from the shore. The muted trumpet is present and the piano and harp shape the ornamentation, the foam of the wave. Clarinets and flutes again remain most prominent in clarity and loudness; the strings keep their agile moving role.

Correspondence between the different materials is achieved through vocoder technique. A vocoder inflicts the spectral content of one sound onto the envelope of another; the resulting sound possesses the harmony of the first and the movement of the other. The Ressac Vocoder makes use of the Ressac envelope with a different harmony.

Orchestration of the Ressac Vocoder on page 56 of the score is quite similar to that of the original Ressac material on page 36, but employs more brass instruments and related (metal) bell sounds. Murail compares vocoder technique and this particular orchestration to the golden mist at sunset depicted in the harbour paintings by the French artist Le Lorrain.

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## AN ANALYSIS OF TRISTAN MURAIL'S *WINTER FRAGMENTS*

Tolga Tüzün

The analysis of timbre has, in the past, remained in the margins of music analysis in the North-American music theory community. None of the articles that were published in the *Journal of Music Theory* and *Music Theory Spectrum* from 1993 to 2005, for example, has sonic objects<sup>92</sup> and their transformations, or timbral transformations, as its principal subject matter.<sup>93</sup>

This exclusion is a result of a concentration on the different modalities of organization of pitch material (e.g. restriction to 12 pitch classes) taken as a sufficient, if not unique, explanation of musical expression. Exclusively pitch material-based analysis leads to a flattened analytical surface, thereby neglecting the combination and interaction of the various elements that contribute to the structure and morphology of a musical network.

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<sup>92</sup> "In Schaefferian theory the term 'sound object' refers to every sound phenomenon and event perceived as a whole, as a coherent entity and heard by means of reduced listening which targets it for itself, independently of its origin or its meaning. The sound object is defined as the correlate of reduced listening: it does not exist 'in itself' but by means of a specific foundational intention. It is a sound unit perceived in its material, its inherent texture, its own qualities, and perceptual dimensions. On the other hand, it represents a global perception, which remains identical through different hearings; an organised unit, which can be compared to a 'gestalt' in the meaning of the psychology of form. Schaeffer suggests that there is some confusion concerning the notion whilst adding: a) The sound object is not the sound body; b) The sound object is not the physical signal; c) The sound object is not a recorded fragment; d) The sound object is not a notated symbol on a score; e) The sound object is not a state of mind (it remains the same across different listening modes)." Paraphrase of Chion 1983: 113-24. 1995 translation by John Dack and Christine North. <http://www.ears.dmu.ac.uk>. Accessed 8 March 2008.

<sup>93</sup> The same is true for papers presented in the Society for Music Theory and the American Musicological Society meetings between the same years. Starting after World War Two, however, European scholars worked prolifically on timbre and its morphology.

The purpose of my analytical research is to introduce a methodology for the analysis of timbral structures.<sup>94</sup> The focus is on how to organize theoretical constructs based on timbral objects and their transformations throughout the temporal dimension of a musical composition. Transformational theory, artificial intelligence theory, music cognition, and psychoacoustics will all serve as references while constructing multiple parallel approaches to the questions that arise from the perception of timbre-oriented music, i.e. electro-acoustic music—questions regarding the categorization and behaviors of sonic objects, the processes that interrelate them, and the challenges of new formal organizations. My intention is to supply analytical tools which are flexible and accessible enough to contribute to, and coexist with, pitch-based approaches.

My goal is to provide a method and some analytical concepts developed from the timbral GIS (Generalized Interval Systems) presented by David Lewin (1987). Under the title “Some Timbral GIS Models,” Lewin describes certain GIS models based on a specific sound type (harmonic-steady sounds) and designs a system of sound classes that reflect “certain aspects of their timbral profiles.” He goes on to build more complex GIS structures and builds a space of “time points” ( $a_1, \dots, a_n$ ) where he can model a class of sounds with a certain developing spectrum by placing them on a temporal map:

Supposing the time points  $a_1$  through  $a_5$  to be dense enough so as to catch enough salient features of the sound class involved (e.g. times when some partial has a pronounced local maximum or local minimum value), then we can consider this sketch to be a good approximation for a continuous relief map that characterizes the class of sounds with respect to its developing spectral “signature.” (Lewin 1987: 83)

My approach, taking as a starting point Lewin’s ideas about the spectral “signature” of a sound class, will be to develop a dynamic understanding of these sound classes. I suggest that a sound class—to which I refer from now on as timbre class—is a dynamic structure that is hard to define given a certain time point, because the components of a timbre class have a (frequently unpredictable) variety of behaviors through time. Segmentation of timbre as a fixed entity causes an epistemological problem, which is in contradiction with the nature of the object that we observe; most likely, the old definition of timbre as a specific superposition and ordering of

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<sup>94</sup> Doctoral dissertation in process at the Graduate Center of City University of New York, directed by Philip Lambert.

frequencies (partials) is the origin of this problem. Today we know that timbre is a dynamic structure, defined by the existence of many sub-components and their non-linear interaction through time.<sup>95</sup> In any musical instance, various timbral constructs interact and form highly complex aural structures.

In order to see the potentiality of timbre classes, I will define them as dynamic timbral functions in musical contexts and suggest analyzing contextual transformations that relate them; naturally, these timbral functions have multiple components that could be represented in an array of potentialities. Whether all the potential qualifications are considered will depend on both the contextual transformations and the topographic/perceptual space to which they belong. This space is the concept of Configuration Space that I borrow from artificial intelligence theory:

Assume that the world and a robot (or set of robots) have been defined. The configuration space,  $C$ , is a topological space generated by the set of all possible configurations. Each configuration  $g \in C$  corresponds to a transformation that can be applied to the robot,  $A$ . A complicated problem such as determining how to move a piano from one room to another in a house can be reduced using Cspace concepts determining a path in  $C$ . In other words, the piano (3D rigid body) becomes a moving point in  $C$ . (LaValle 2005: 65)

For the development and analysis of algorithms, however, it will be convenient to view the path planning as a search in the space of possible transformations that can be applied to the robot,  $A$ . This space of transformations is termed the configuration space, which represents a powerful representation that unifies a broad class of path planning problems in a single mathematical framework. This facilitates the development of path planning techniques that can be applied or adapted to a wide variety of robots and models. (LaValle 2005: 59)

I find useful the relation of this concept of path planning with the conception of a musical space and the path of the timbral object that it involves. Musical spaces and motions are useful metaphorical transfers for

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<sup>95</sup> “Subsequently, tape-recorder manipulation ... has made it easy to demonstrate the influence of time factors on tone quality. For instance, playing a piano tone backwards gives a non-piano-like quality, although the original and the reversed sound have the same spectra” (Risset and Wessel 1999: 117).

our understanding of music.<sup>96</sup> In music theory, several theoretical models deal with the concept of space, such as Fred Lerdahl's Tonal Pitch Space (2001) or Robert Morris's Voice Leading Space (1998). The inherent difficulty of applying these constructs to timbral analysis lies in the fact that they rely on pre-defined concepts of tonal functions or twelve pitch classes, which are irrelevant, most of the time, to timbral analysis. Consequently, I propose a Timbral Configuration Space (TCS) that takes account of all motions and contextual transformations of the timbral objects in a defined musical surface. Motions and transformations will also be analyzed with dynamic concepts of Transformational Paths:

A path,  $P$ , is a continuous function,  $P: [0; 1] \rightarrow X$ , in which  $X$  is a topological space. Note that a path is a function, not a set of points.

Each point along the path is given by  $P(s)$  for some  $s \in [0; 1]$ . (LaValle 2005: 64)

Therefore, the Transformational Path (TP) of the timbral object ( $x$ ) could be defined as:

$TP(Func)(x) \rightarrow (x')$

If  $x \in TCS\ z$  then  $x' \in TCS\ z$

A Transformational Path (TP) defined by a function maps  $x$  onto  $x'$ ; if  $x$  is a member of a Timbral Configuration Space (TCS)  $z$  then  $x'$  is also a member of the same TCS  $z$ .

## WINTER FRAGMENTS

Applications of transformational analysis to timbral structures, introduced by Lewin, have been pursued in recent years by music cognition and music perception scholars. Furthermore, many articles published in the *Computer Music Journal* offer a deeper perspective into the applications of interdisciplinary theories in order to analyze timbral structures. My research is in the process of developing a set of meta-classes of timbral qualities—to which I referred earlier as potentialities of timbral arrays—in order to segment the musical continuum and therefore derive more formalized hyper-transformational paths that work not only in a given TCS but between many TCS's. This article introduces early stages of the TCS concept and concentrates mostly on its practical application on Tristan Murail's *Winter Fragments* (2000), a composition for chamber ensemble and electronics.

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<sup>96</sup> See Cook 1990, Scruton 1997, and Zbikowski 2002.

For the sake of simplicity and brevity, I will proceed chronologically through the piece and use pre-defined concepts of TCS and TP. Let us look at the first measure of music and define the first analytical space [Example 1]:

The image shows a musical score for the first four measures of 'Winter Fragments'. The score is written for seven instruments: Synth, Clavier, Piano, Flûte, Clar., Violon, and Vcelle. The key signature is one sharp (F#). The tempo is marked as quarter note = 60 (♩ = 60). The score includes various musical notations such as notes, rests, and dynamic markings (mp, pp). There are also performance instructions like 'l'ointain' and '(ad lib. : con sord.)'. The score is divided into measures by vertical bar lines.

**Example 1. *Winter Fragments*, mm. 1-4.**

The elements presented in this passage are:

1. Piano chord accompanied by electronics
2. Melody played by the flute
3. Two subordinate lines:
  - a- electronic line echoing the flute melody
  - b- violin and cello notes imitating and holding the flute melody.

Departing from the clear phrase structure and from well defined timbral distinction between components, I propose a TCS 1 where:

HT 1 (piano, electronics)	€ TCS 1
ECHO (electronic)	€ TCS 1
ML 1 (flute)	€ TCS 1
FREEZE (vln, vcl)	€ TCS 1

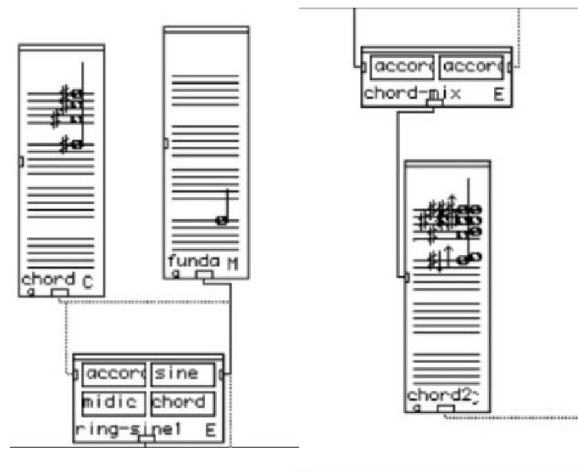
and where all these components and their various transformations form that space [Example 2].<sup>97</sup>

The musical score for Example 2, *Winter Fragments*, measures 1-4, is presented for a multi-instrument ensemble. The score is organized into seven staves: Synth, Clavier, Piano, Flute, Clarinet, Violon, and Vcello. The first measure is marked with a box containing 'I' and 'a', and a tempo indication of  $\text{♩} = 60$ . The second measure features a large bracketed section labeled 'HT 1' and 'ECHO'. The third measure is marked 'ML 1'. The fourth measure is marked 'FREEZE'. The score includes various musical notations such as notes, rests, and dynamic markings like 'mp' and 'pp'. The Violon part includes the instruction '(ad lib. : con sorg.)'.

**Example 2. *Winter Fragments*, mm. 1-4: Parsing of the Components-TCS 1.**

<sup>97</sup> Depending on the previous definition of TCS.

Let us examine each component in detail. HT 1 (Harmony-Timbre) is a combination of a piano dyad (F $\sharp_5$  and F $\sharp_6$ ) with the electronic complement formed by ring modulation (RM)<sup>98</sup> of the first four harmonics of an F $\sharp_5$  spectrum. [Example 3] illustrates a sub-patch from PatchWork software, an algorithmic composition aid, showing the process that created that sonority.



### Example 3. Resulting Harmony of Ring Modulation Process.

<sup>98</sup> “In digital systems, RM is simply the multiplication of two bipolar signals by one another. That is, a carrier signal  $C$  is multiplied by a modulator signal  $M$ . ... when the frequency of  $M$  is in the audible range, the timbre of  $C$  changes. For each sinusoidal component in the carrier, the modulator contributes a pair of *sidebands* to the final spectrum. ... These sidebands are the sum and the difference of the frequencies  $C$  and  $M$ . ... If  $C$  and  $M$  are more complex signals than sine waves, ... the resulting output spectrum contains many sums and difference frequencies” (Roads 1996: 216-17).

<sup>99</sup> PatchWork is a software tool for computer-assisted-composition developed at IRCAM by Mikael Laurson, Jacques Duthen, and Carlos Rueda. It is a visual interface for LISP programming language and it is used by many European composers with highly diverse musical and aesthetic backgrounds, including Antoine Bonnet, Brian Ferneyhough, Gérard Grisey, Paavo Heinenen, Magnus Lindberg, Claudy Malherbe, Tristan Murail, and Kaija Saariaho in the 1980s. I am grateful to Tristan Murail for sharing his patches with me.





The third component, the flute melody ML1, is a combination of HT 1 and ECHO. It starts from the piano chord (F#) and moves toward ECHO, therefore creating a bridge between two distinct components.

The fourth component is FREEZE. The violin and cello, while imitating the flute melody, create, by holding the flute pitches, the illusory effect of freezing this melody in time.

The ambiguity of the roles and functions of different elements will be the feature of TCS 1 and will be carried on throughout the piece. The interdependent relations of components reveal the fact that they belong to a network of relations; they thereby let us define a perceptual sonic space (TCS 1). Another feature of this space is a timbre-oriented one: HT 1 is a bright timbre that metamorphoses to a collection that could be defined as pale. The electronic line is colored by a small amount of higher rank harmonics, whereas the strings play with artificial harmonics, thus without fundamental frequencies. Their resulting timbre is very close to pure sine waves, in this case lacking the richness of their source. In addition, HT 1 produces a sharp attack, a stimulus for others, which dissolves in a span of 10 to 12 seconds. Every musical event is initiated by a crescendo from *niente*, thus the space does not have any other significant attack points.

Therefore, I will assign to TCS 1 two additional components:

Bright  $\rightarrow$  Pale  $\in$  TCS 1

Fast Attack  $\rightarrow$  Slow Attack  $\in$  TCS 1.

Throughout the first one and a half minutes, this space is intact in terms of content. Nevertheless, the components go through various transformations. The melody played by the flute undergoes a series of transformations that will be called EXPAND [Example 5].

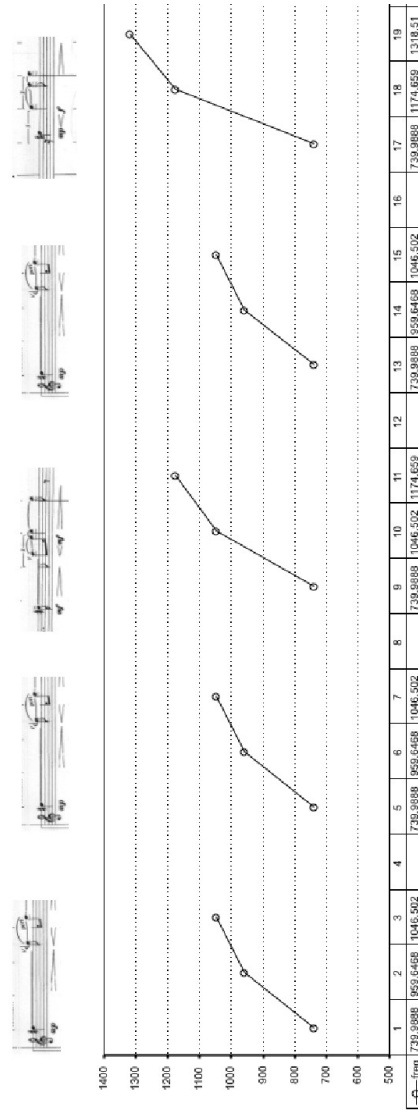
We can define a Transformational Path class EXPAND where its local application could be translated as:

TP (EXPAND<sub>(ML1, ML2)</sub> (ML 1)  $\rightarrow$  (ML 1').

Since ML1 belongs to TCS 1, all its Transformational Path partners belong to this local path.

A change in ML 1 affects the electronics first: ECHO changes its pitch content, and modifies its function of exact replication; instead, two new pitches are featured [Example 6].

As soon as Rehearsal F is heard, an important change occurs in ML 1: the three pitches are not only expanded (remember the EXPAND path) but also, by the addition of two new pitches, the cardinality of ML1 changes from 3 to 5 [Example 7]. We will soon explore the importance of this five-note phrase.



**Example 5. Transformation EXPAND of ML1 (Flute).**

e

1-e

1-e2

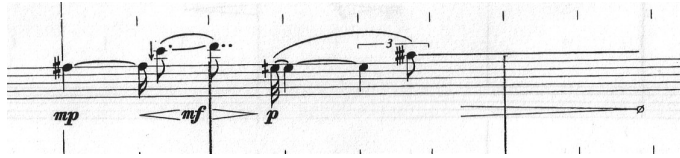
proche

mp < f

mp

f

**Example 6. Additional Pitches in Electronics' ECHO.**



**Example 7. *Winter Fragments*, First Appearance of Five-Note Phrase in Rehearsal F.**

A significant amount of transformation of the initial components occurs at Rehearsal F, which is an instance within TCS 1. One can speak of an increase of tension throughout the first minute, and Rehearsal F is a relative climax. This fact affects not only the theoretical space but also the surface of the music. Leaving aside a clearly audible shift in harmonic space, the instrumental design, which defines the timbral space significantly, is influenced by these transformations: the violin has ceded its role to the clarinet. At the one-and-a-half-minute mark, Rehearsal G in the score, the initial elements of TCS 1 return at the same pitch level. Nonetheless, the complete TCS has gained momentum: the components move faster in time compared to their previous occurrences.

At Rehearsal H, at approximately one minute and 48 seconds, an important shift occurs: most of the components of TCS 1 disappear from the surface of the music [Example 8]. New objects replace them and help us define a new configuration space.

This is a clear disruption of the established sonic paradigm. The electronics outline a new harmony-timbre where the piano and the strings' pizzicati color that space, the latter with a sort of interrupted pulsation effect.

Considering this clear rupture, and the clear shift in timbre classes, I will define TCS 2 where:

HT 2 (piano, electronics)	€ TCS 2
ECHO (electronics)	€ TCS 2
PIZZ (violin, cello)	€ TCS 2

and where all these components and their various transformations form that space.

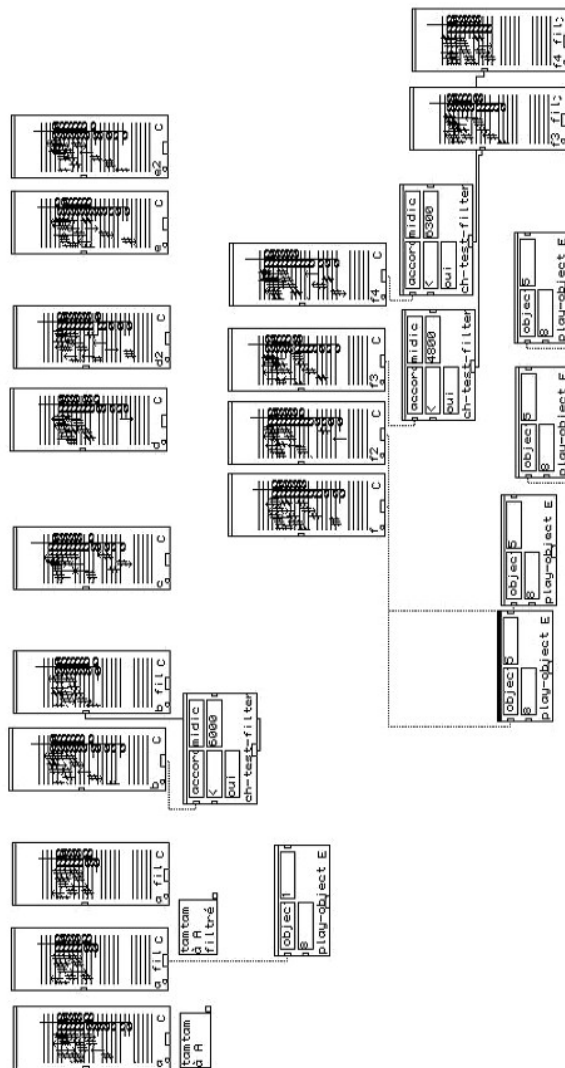
Let us look at these components in detail. HT 2 is defined by a chord articulated in electronics along with trills and downward and upward arpeggios in the piano part. The electronics' chord is based on a tam-tam analysis. The resultant spectrum data are reshaped, filtered, and distorted in order to obtain various timbral transformations. [Example 9] is the PatchWork patch showing the tam-tam sound object's various transformations obtained by frequency distortion, filtering, and transposition.

The image displays a musical score for a rehearsal section titled "Winter Fragments, Rehearsal H." The score is arranged in a multi-staff format, with each staff corresponding to a different instrument or voice part. The instruments listed at the bottom of the score are Synth, Clarinet, Piano, Flute, Clarinet, Violon, and Vocal.

The score begins with a rehearsal mark "h" in a box. The Synth part features a series of notes, with a specific measure marked "1-4b". The Clarinet part has a measure marked "1-42". The Piano part includes a complex, dense texture of notes, with a measure marked "1-42". The Flute part has a measure marked "1-43". The Violon part has a measure marked "1-42". The Vocal part has a measure marked "1-42".

The score includes various musical notations, such as notes, rests, and dynamic markings. The dynamic markings include "p" (piano), "mf" (mezzo-forte), and "f" (forte). The score also includes a "pizz." (pizzicato) marking for the Violon part.

Example 8. *Winter Fragments*, Rehearsal H.



**Example 9. Various Transformations of Tam-tam Timbre.**

The ECHO in the electronics states ML1 with the insertion of  $F\sharp$  into the initial ECHO figure. One tends to hear ECHO in TCS 1 as an echo of the flute melody. Nevertheless, when it returns at TCS 2, it reveals itself not as an echo of the flute melody, but rather as an echo of ML 1 of TCS 1 in the new TCS 2 milieu. Thus, ECHO discloses itself as a diachronic echo instead of a synchronic one. The local component reaches far back and functions as a bridge between two different perceptual spaces, nesting the past into the present as a reminiscence.

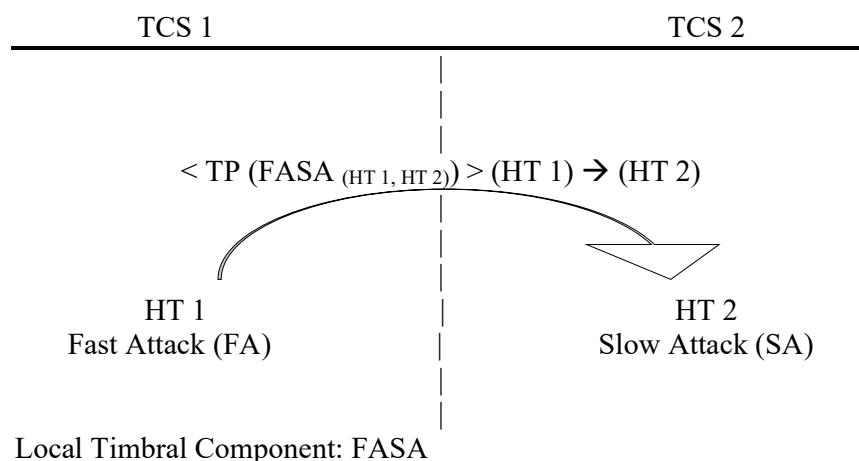
Violin and cello pizzicato figures are the last component of TCS 2. They derive their pitch material from the pitch space created by HT 2. The sharp pizzicato attacks are an important timbral feature of TCS 2: they relate by their timbral envelope to the HT 1, the only component with a sharp attack so far. In addition, their temporal behavior is the first appearance of a clear rhythmical statement. Taken together, these hesitating pizzicato pulsations and muted piano define a transient momentum along with dark and sharp timbral features. Therefore, I will assign additional components to TCS 2:

Slow attack  $\rightarrow$  Fast attack  $\in$  TCS 2

Dark and muted  $\in$  TCS 2.

Before going any further in the piece, I want to focus on some relationships between TCS 1 and TCS 2. TCS 1 starts with a sharp attack formed by an inharmonic component, a ring-modulated piano chord, and a harmonic component, the piano sound itself, if one considers it a harmonic timbre. On the other hand, TCS 2 opens with an inharmonic timbre with slow attack, re-synthesized tam-tams, and a harmonic component, the piano's arpeggios. At this moment, one can backtrack a local component of TCS 1, Fast Attack  $\rightarrow$  Slow Attack, and find out that this is not only a perceptual component but also a hyper-transformational path working between TCS 1 and TCS 2: sharp attack of HT 1 (ring-modulated  $F\sharp$ ) relates to slowly attacked electronics HT 2 originating from tam-tam) [**Example 10**]. This is the consequence of the "designed ambiguity" incorporated in the internal dynamics of the piece.

With Rehearsal I in the score, after the establishment of TCS 2, the components of TCS 1 return to the musical surface [**Example 11**].



**Example 10. Hyper-transformational Path of <TP> Operating between HT 1 and HT 2.**

F<sup>#</sup>5 of ML 1, however, is now transposed down to D<sub>5</sub>.<sup>100</sup> HT 1 and ML 1 follow this transformation and develop their TCS 1 behaviors in this transposed pitch space. This is a new paradigm: TCS 2 acted as a disruption during the flow of TCS 1 and functioned as a “shifter,” transforming the pitch space. The importance of this passage is noticeable if one realizes that the components of TCS 2 do not drop out of the musical surface. The articulation of HT 2 continues in electronics while all the components of TCS 1 recover. One can say that two TCS cohabit the same surface, while the ML 1 brings back the foreground material on the top of this shared space. This melodic articulation is clearly a five-note phrase, first seen when formed by the additional notes in ECHO [Example 6], not imitating the melody but contributing to it; second, when formed by the five attack points in the flute line [Example 7], and now returning at Rehearsal K as a particular statement [Example 12].

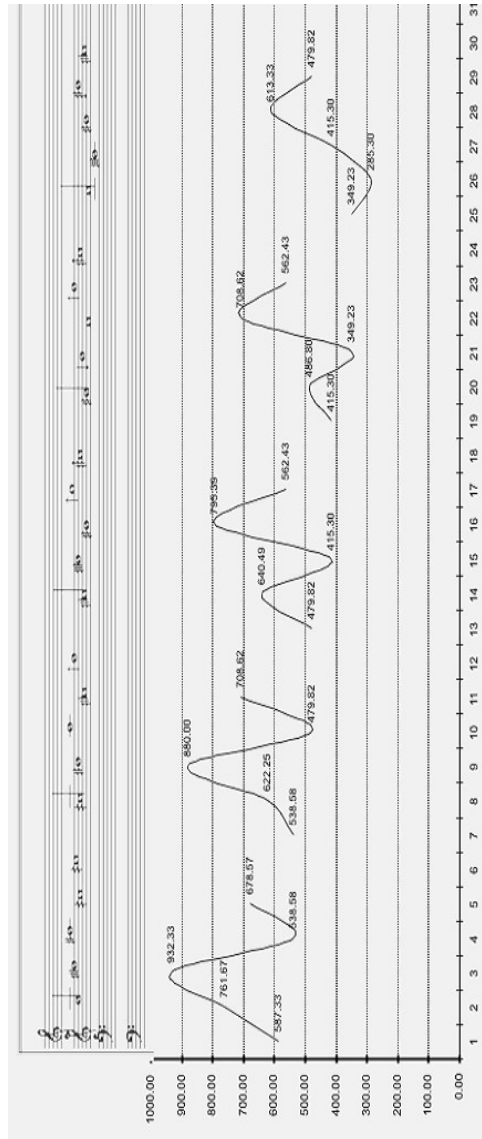
<sup>100</sup> Note that the transposition ML 1 in Rehearsal J is not a linear one; even when you have 24 equal division of the octave, in order to obtain this pitch level, you first have to transpose ML 1 down by 400 cents, then distort the upper notes by 1.019 and 1.031 respectively. Transposition is a contextual tool assuring the sonic concordance between components within a given timbre space (private communication with the composer).



**Example 11. *Winter Fragments*, Merging Two Sonic Environments TCS 1 and TCS 2 in Rehearsal I.**

The image shows a page from a musical score for 'Winter Fragments'. The page is oriented horizontally but contains musical staves arranged vertically. The staves are labeled from left to right: Synth., Clarinet, Piano, Flute, Clarinet, Violin, and Voice. Rehearsal K is marked with a box containing the letter 'K' at measure 140. Rehearsal L is marked with a box containing the letter 'L' at measure 143. The score includes various musical notations such as notes, rests, and dynamic markings like 'pp' and 'mf'. There are also some handwritten annotations and a large, dense, scribbled-out section in the Piano part between measures 140 and 143.

Example 12. *Winter Fragments*, Rehearsals K and L.

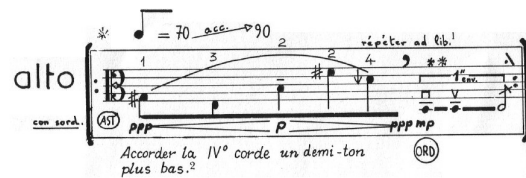


**Example 13. *Winter Fragments*, Melodic Interpolation between Rehearsals L and Q.**

Example 14. Realization of the Same Interpolation on the Musical Surface.

This is where the melody undergoes another type of transformation: instead of expansion, interpolation. Interpolation here is a gradual modification between two poles: the five-note melody, the starting pole, moves toward another five-note figure. [Example 13] illustrates the result of the process and [Example 14] shows its musical realization.

The last five-note melody is the opening of *Prologue*, a composition for viola by Gérard Grisey [Example 15].



**Example 15. Gérard Grisey, Opening of *Prologue* for Solo Viola.**

The interpolation occurring from Rehearsal L to Rehearsal Q is a directed metamorphosis of an object. The composer calls this process “vectorisation of discourse.” Thus, interpolation is a Transformational Path class where:

TP (INTERPOLATE<sub>(x, y)</sub>) (x) → (y)

This change of identity of a musical object is a concept inherent to spectral thought, where the harmony, melody, timbre, and rhythm are “facades” of the same phenomenon, namely sound. Therefore, many musical instances do not lend themselves to uni-functional and uni-directional perception, but rather to a multitude of different interpretations. As I mentioned before, this designed ambiguity inscribes itself into the musical discourse and generates multi-layered and multi-dimensional readings. The perceptual focus is shifted to different strata. This ambiguity is emphasized by the conjoint surface of TCS 1 and TCS 2 during Section II; all the components of two configuration spaces become prominent, and FREEZE is heard less and less after Rehearsal F. This is because the rhythmic grid becomes increasingly dense; one can hear a more agitated surface where FREEZE would not function. Simply put, there is nothing to freeze.

## CONCLUSION

My future research plan consists of establishing a well-formalized segmentation of the musical continuum by defining sets of classes of timbral

properties. These classes will encompass contextual timbral instances, or functions—just as ECHO and FREEZE were instances of general timbre class RESONANCE, while HT1 and HT2 were instances of general timbre class ATTACK. Furthermore, various descriptive configurations should be assigned to TCS in order to formalize and compare various spaces. Thus, components such as Complexity, Density, Harmonicity, and Register will be defined and added to a contextual definition of a TCS. The same approach is applicable to the Transformational Paths (TPs), where components such as Density, Direction, and Timespan will be added to the contextually defined TP.

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## THE MUSIC OF SOUND: AN ANALYSIS OF *PARTIELS* BY GÉRARD GRISEY

Chris Arrell

### INTRODUCTION

This paper presents an analysis of Gérard Grisey's *Partiels* (1975). The piece is the third of the cycle *Les Espaces acoustiques* and widely acknowledged as a paradigm of early spectral thought. Among the topics addressed are: harmonic (harmonicity/inharmonicity) and rhythmic (periodicity/aperiodicity) approaches to tension and release; "difference," Grisey's method of scaling by perceptual weight; the grammar of process; and the orchestral realization of electronic studio techniques, including additive synthesis and ring modulation.<sup>101</sup>

### TENSION AND RELEASE

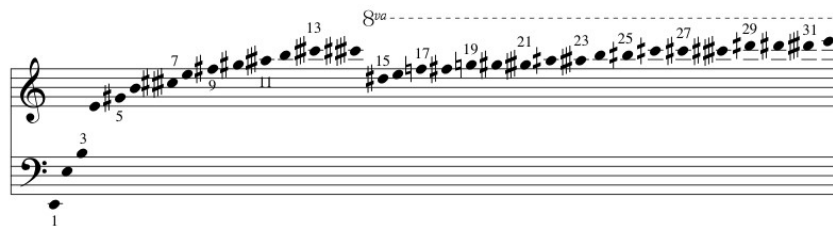
[Dodecaphonic techniques] had disassociated the parameters, turning upside down the concepts of [vertical and horizontal], of harmony and melody. [I]n serial music, the interplay of permutations becomes an obstacle to memory, it forbids radical renewal along with all the types of surprises, excesses and deviations that tonal music offers to its listeners. In short, serial music neutralizes the parameter of pitch ... (Grisey 2000: 2).

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<sup>1</sup> This paper is a revision of several extracts from my dissertation "Pushing the Envelope: Art and Science in the Music of Gérard Grisey" (DMA dissertation, Cornell University, 2002). I would like to express my sincere thanks to my committee members Martin Hatch, Roberto Sierra, and Steven Stucky (Chair), and to Tristan Murail for his numerous analytical insights.

## Harmonicity, the Overtone Series, and Inharmonicity

*Partiels* is inspired by a spectral analysis of a low E<sub>2</sub> (82.4 Hz) played *forte* on the trombone.<sup>102</sup> As with many other instruments that produce a clear fundamental pitch, the frequency components, or **partials**, of a trombone spectrum form an overtone series.<sup>103</sup> (See **Example 1**.) Spectra of this type are termed harmonic. Inharmonic spectra, such as a drum or cymbal, are the counterpart of harmonic spectra. Spectra of this type lack a clear fundamental pitch and have frequency members that do not form an overtone series.



**Example 1. First 32 Overtones of E, 82.4 Hz, Rounded to the Nearest Quarter-tone.**

## Difference and Process

“Difference” is Grisey’s term for the perceptual distance between successive events. According to the composer, if the musical narrative consists of similar process generated events then the listener is able to predict future events as long as the process continues.<sup>104</sup> Difference, therefore, is small. On the other hand, if the narrative consists of unrelated events that the listener is unable to predict, then the difference is large (Grisey, in Bündler 1996: 3). The amount of tension depends on the amount of difference.

<sup>102</sup> The analysis inspired the entire cycle.

<sup>103</sup> An overtone series is a succession of ascending frequencies in which each member is a whole multiple of the lowest frequency, or fundamental. Grisey rounds frequencies to the nearest sixth-tone in *Partiels*.

<sup>104</sup> Grisey describes this type of listener foresight as pre-audibility.



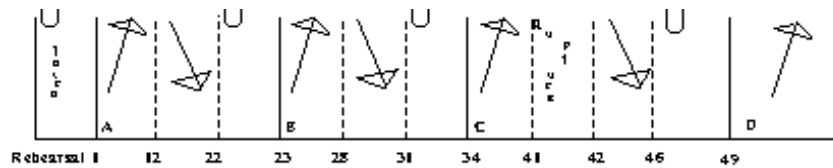
## ANALYSIS OF *PARTIELS*

*Partiels* closes the first half of *Les Espaces acoustiques* (1974-1985). The entire cycle contains six works—*Prologue* for solo viola (1976), *Périodes* for seven musicians (1974), *Partiels* for 16 or 18 musicians (1975), *Modulations* for 33 musicians (1976-77), *Transitoires* for large orchestra (1980-81), and *Épilogue* for four horn soloists and large orchestra (1985). Grisey unifies the separate works of the cycle by several methods including an evolving, but consistent approach to harmony, rhythm, and form; the structural importance of spectra with E as fundamental; the use of elision to blur divisions between works; and the scoring of each successive work for a larger ensemble. Indeed, all the works are cyclical. The last work, *Épilogue*, ends with a quotation of the principle phrase from the first work, *Prologue*.

### Form

The formal metaphor is the tripartite respiratory rhythm of inhalation, exhalation, and repose. There are three complete respiratory patterns in *Partiels*. *Modulations* concludes the fourth pattern (see discussion below). Repose sections are primarily harmonic and rhythmically periodic. Inhalations move toward inharmonicity and rhythmic irregularity, or aperiodicity. Conversely, exhalations move towards harmonicity and periodicity. These large-scale oscillations between harmonicity/inharmonicity and periodicity/aperiodicity draw a tension graph that mirrors the compressions and rarefactions of a sound wave.

In his analysis, Jérôme Baillet (2000) divides the final section into three parts with small decreases and increases in tension. My analysis shows the last section of *Partiels* as a single inhalation, its complement ending at Rehearsal 17 of *Modulations* where both harmonicity and periodicity return. (See **Example 2**.)



**Example 2. *Partiels*: Formal Graph.**

*Episode 1 (to Rehearsal 22)*

Introduction and Inhalation (to Rehearsal 11)

The ending of *Périodes* is also the opening of *Partiels*. The passage marks Grisey's first use of additive synthesis. Tristan Murail aptly describes the technique as the fusing of harmony to create timbre, or conversely, the diffusing of timbre to create harmony (1984: 158). In orchestral realizations, the partials of a single complex sound are approximated to pitch (in *Partiels* to the nearest sixth-tone) and dispersed across any number of instruments, each instrument playing a separate component of the sound modeled.

As mentioned above, *Partiels* is inspired by a spectral analysis of a low E<sub>2</sub> (82.4 Hz) played *forte* on the trombone. The trombone E and repeated open E bass strikes begin the piece. As the bass strikes cease and the trombone fades from *forte* to *niente*, the other instruments of the ensemble enter, each playing a separate partial of what the spectral analysis revealed as constituting the trombone spectrum. It is a striking effect. Time dilates and harmony slowly emerges from timbre as a macroscopic journey into the microscopic interior of the trombone spectrum begins (Grisey 1998: 298). "Music is what sounds become" (292).

Grisey's orchestration of the passage reflects several traits of the trombone spectrum. The repeated double bass notes played *alto sul ponticello* depict noise transients that occur in the initial attack phase of the trombone E. Following the attack phase, the trombone, supplying the fundamental, gradually diminishes from a double *forte* while the remaining partials begin at triple *piano* and grow to separate peaks before a tutti *diminuendo*. The second, third, and fifth partials, played by the double bass, clarinet, and violoncello, respectively, have the loudest dynamic markings, but there is also a strong formant, or frequency region, at the eleventh partial emphasized by timbre and a relatively stronger dynamic marking. (See **Example 3.**)

♭ = flat 1/6 tone

The musical score consists of four staves. The first staff is for Violin, marked 'ad lib', with notes for partials 8, 13-21 (odds), and 22. The second staff is for Piccolo (11), Viola (7 & 9), and Cello (5). The third staff is for Clarinet (3) and Bass (2). The fourth staff is for Trombone (1). The notes are clustered in the upper register, with some lower notes in the bass staff.

### Example 3. Additive Synthesis (First Chord of *Partiels*).

The inhalation repeats the opening orchestral synthesis chord 11 times, expanding the spectrum up to the 25<sup>th</sup> partial and adding an additional 11 instruments. Grisey divides pitch content into four zones (1991: 357). Pitches in zone one (odd partials 1 through 7 and the pedal bass) are present throughout the inhalation; pitches in zone two disappear and reappear. The first and second zones are stationary in register. Grisey labels the third and fourth zones as formant frequencies. Pitches in these zones gravitate towards the bass and distinguish themselves from the stationary zones by instrumentation—percussion plays the third zone; winds dominate the fourth zone.

The introduction of inharmonicity is gradual. For the first five chords (Rehearsals 1 through 5), the formant frequencies of the third and fourth zones descend to notes within the series and are therefore harmonic. Percussion adds the first inharmonic note by an octave transfer of the 25<sup>th</sup> partial (C<sub>7</sub>) in the sixth chord (Rehearsal 6). The seventh chord (Rehearsal 7) shifts two more partials, the 21<sup>st</sup> and 17<sup>th</sup> (A<sub>6</sub> one-eighth flat and F<sub>6</sub>, respectively) to A<sub>5</sub> and F<sub>5</sub>. At Rehearsal 8, the eighth chord also moves two partials, the 19<sup>th</sup> (G<sub>6</sub>) to G<sub>5</sub>, and 15<sup>th</sup> (E<sub>6</sub>♭) to E<sub>5</sub>♭. The process increases with each chord, and by the last chord (Rehearsal 11) inharmonic notes are thick. Half-step approximations apply to all octave transfers. Grisey sometimes rounds quarter-tones to the nearest half-steps above and below when transferring down an octave. In the ninth chord, for example, the 11<sup>th</sup> partial (A quarter sharp) becomes both A and B<sub>♭</sub>, and in the 11<sup>th</sup> chord, the 13<sup>th</sup> partial (C quarter sharp) rounds to both C natural and C<sub>♯</sub> (Rehearsal 9). Interestingly, Grisey does not include the accordion notes in his explanation

of pitch for the section (1991: 357). One possibility for the omission is that the process of octave transfer does not govern the accordion notes. Most of the pitches come from the overtone series, but for the last two chords the pitches of the four zones and accordion complement and overlap, providing all notes of the chromatic scale except E $\flat$ . Grisey reserves the E $\flat$  for the first bass note of the exhalation. (See **Example 4**; Rose 1996: 10; and Grisey 1991: 374.)

1 2 3 4 5 6 7 8 9 10 11

Zone 4

Zone 3

Zone 2

Zone 1

Noise

**Example 4. First Inhalation (Rehearsals 1 to 12).** Open note heads are inharmonic tones; diamond note heads are accordion pitches.

As the process of octave transfer steadily increases inharmonicity, the envelopes mutate,<sup>105</sup> and partials begin to enter out of sequence (see, for example, Rehearsal 9).<sup>106</sup> At Rehearsal 4, the attack phase of the spectral envelope begins to expand in time by a gradual increase of noise transients, represented metaphorically by periodic instrumental noise such as string over-bowing, wind growls, and erratic brass muting. The bass strikes that

<sup>105</sup> The envelope of a sound contains the three stages of attack, sustain, and decay.

<sup>106</sup> Partials usually enter progressively from low to high frequencies in natural spectra.

mark the start of each synthesis mirror the mutation of the attack and become increasingly aperiodic. (See **Example 5**.)



### **Example 5. Bass Attacks (Opening to Rehearsal 12).**

#### **Exhalation and Repose (Rehearsals 12 to 22)**

Spectral composers have extracted several methods of artificial sound production from the electronic studio and adapted them to their instrumental writing. Additive synthesis is one example. Frequency and ring modulations are also common. A ring modulation (RM) occurs when a frequency results as either the sum or difference of two generative frequencies. The equation  $f = (a * i) \pm (b * i)$  expresses the result, where  $f$  = frequency,  $a$  = generator 1,  $b$  = generator 2, and  $i$  = index of modulation. The complexity of the ratio between the two generating frequencies determines the degree of harmonic or inharmonic.

A bottom-heavy chord distributed among the bass, cello, trombone, horn, and clarinets, and containing the missing  $E\flat$  of the previous chord as its lowest member, sounds with a single blow to the tam-tam to start the first exhalation. Two measures after Rehearsal 13, the difference between the notes of the bass dyad ( $B\flat_1$ , 58.22 Hz, and  $A_1$ , 55.0 Hz) yields a frequency of 3.22 Hz. As the value is below the range of human hearing, on average around 20 Hz, the composer transcribes the frequency as ten equal pulses in the space of three seconds, and scores the rhythm for the tambour. Three measures before Rehearsal 14, the tambour rhythm slows to 11 equal pulses in the space of four quarters, a value of 2.75 Hz resulting from the difference frequency of the bass clarinet ( $G_1$ , or 49 Hz) and bass ( $F\sharp_1$ , or 46.25 Hz) pitches occurring at five and three measures before Rehearsal 14, respectively.

Beginning at Rehearsal 14, generative pitches begin a gradual ascent in the shape of an erratic sound wave. Ring modulation and a rising register continue throughout the section, and by Rehearsal 20 all generative and difference pitches are within a quarter-tone of the frequency components of

the trombone spectrum.<sup>107</sup> **Example 6** shows generators and difference tones for Rehearsals 14 through 21 (Wilson 1989: 62-63).

As with all exhalations, the goal of the passage is an arrival to a repose of minimal tension. The repose begins at Rehearsal 22. Quasi-periodic repetitions add a rhythmic counterpoint to the slight inharmonicity of the flute glissandi, but the effect is still a brief respite in the oscillating curves of the tension graph.

Rehearsal 14

Rehearsal 16

Rehearsal 18

Rehearsal 20

Rehearsal 21

**Example 6. Ring Modulation, First Exhalation (Rehearsals 14 through 21).**

*Episode 2 (Rehearsals 23 to 33)*  
*Inhalation (Rehearsals 23 to 27)*

Overlapping heterophonic strands that alternately accelerate and retard announce the start of the second inhalation. Five large phrases, differentiated by orchestration and unified by a descent toward the bass, and expanding pitch class content, rhythmic activity, timbral density, and volume, slowly increase inharmonicity. Strings play the first phrase, entirely

<sup>107</sup> Grisey transposes the spectrum down by one octave.

harmonic, alone. The second phrase (Rehearsal 24) adds the flutes. Where the notes of the first phrase are entirely harmonic, the second phrase adds a single inharmonic tone and resumes the process of ring modulation. The flute notes act as generators, creating pitches for four additional lines scored for the strings. Since most of the flute tones are whole multiples of the fundamental, inharmonicity is slight and the modulation pitches are close to the previous phrase. For example, the 17<sup>th</sup> and 7<sup>th</sup> partials return the 24<sup>th</sup> and 10<sup>th</sup> partials, respectively, as additive and difference tones ( $17f+7f=24f$  and  $17f-7f=10f$ ). A note outside the spectrum results if the modulation is between a partial and the inharmonic  $C_5$ . Because  $C_5$  is close to the 13<sup>th</sup> partial ( $C_5$  quarter sharp), however, the difference tone is only slightly inharmonic. (See **Example 7**.)

Rehearsal 25

The musical score for Rehearsal 25 illustrates the process of ring modulation. The flute parts (Fl 1 and Fl 2) play a sequence of notes: A, B, D, F, and I. The string parts (Violins and Violas) play sum and difference tones of the flute notes, labeled as A+B, B+C, C+D, D+E, E+F, F+G, G+H, and I. The Clarinet part plays a sequence of notes: B, A, B, C, D, and ect. The Viola 1 part plays B-C, D-E, and F+G. The Viola 2 part plays A-B, C-D, E-F, and G-H.

**Example 7. Ring Modulation, Second Inhalation, Second Phrase (Rehearsal 25).**

Orchestration is systematic. Grisey always gives sum and difference tones to the strings or, if the frequency dips below the hearing threshold of 20 Hz, a “lion’s roar” in the percussion. The third phrase (Rehearsal 25) thickens the flute lines by doubling their pitches in the clarinet, and adds two

more inharmonic tones ( $B\flat_3$  and  $G_4$ ). With the fourth phrase (Rehearsal 26) the register extends below the range of the flutes, and the task of providing generative pitches—now more inharmonic than not—falls to the clarinets, who in turn pass the role of doubling to the English horn. The evolution of the modulators from light to dark timbres concludes with the French horns in the fifth and final phrase (Rehearsal 27).

The number of modulators increases by one for each phrase, beginning with six and ending with nine. By the final phrase all 12 pitches of the chromatic gamut (measured in semitones) have acted as generators. (See

**Example 8.)**

Rehearsal:

24 25 26 27

Flutes Clarinets French Horns

**Example 8. Ring Modulation Generators, Second Inhalation (Rehearsals 24 to 28).** Inharmonic tones are diamond-shaped note heads.

**Exhalation and Repose (Rehearsals 28 to 33)**

Additive synthesis is a cumulative process that builds from silence by gathering a number of frequency components under a single envelope. Another method of creating spectra is subtractive synthesis. For this technique, a composer begins with all frequencies in the form of white noise and then applies filters to create the desired timbre. The second exhalation is an analogy for this reductive process.

A blow to the tam-tam provides a dense sound model paraphrased in the pitched instruments as a compressed chromatic cluster partitioned among the strings and winds as two whole-tone scales spaced a semitone apart, the wind set omitting the fundamental (E). Playing style adds additional noise elements with erratic wind vibrato, percussion rolls, and ricochet in the strings. As the cluster fades, the bass initiates a canon that passes from low to high strings before moving to the woodwinds at Rehearsal 29. Each successive voice transposes the canon up a semitone. Grisey draws the majority of pitches from an intervallic canon of the cello line, but he makes small adjustments, preferably by half-step, to avoid the first note of the next line, keep instruments within their ranges, and withhold the pitch class of the



fundamental for the goal of the inhalation. Obviously, an adjustment that aligns two instruments to the same note and interval of the series would create a unison canon. Grisey makes additional alterations to avoid more than two repetitions of the same pitch class in different instruments, presumably to keep the different lines of similar timbres distinct by pitch.

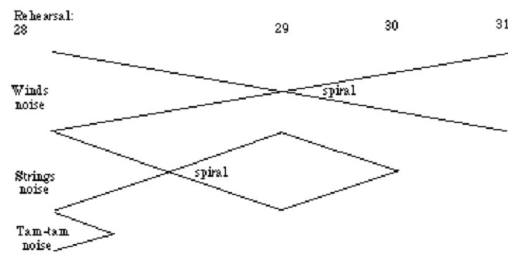
**Example 9** shows the first 18 pitches of each string instrument. Whole-note heads are alterations to the canon. Arrows indicate unisons. The letter F signifies that the fundamental would have occurred if the canon had progressed unaltered. For example, the bass moves from A to E $\flat$ , rather than from A to E, for its third interval, skipping over the fundamental by a semitone. The letter R applies only to the second violin, who would need to retune to reach some of the lower notes. There is also one adjustment to keep the bandwidth (BW) of a line below the starting pitch of the next entry (viola 1, 13<sup>th</sup> note).<sup>108</sup>

**Example 9. String Canon, Second Exhalation (from Two Bars after Rehearsal 28 to Rehearsal 31).**

A long, spiraling ascent slowly moves pitch to the upper register. (See **Example 10**.) String phrases always include six pitches and fairly constant

<sup>108</sup> Steven Stucky greatly helped my analysis of this section.

subdivisions of the pulse. Winds perform a notated *accelerando* by gradually increasing subdivisions from one to eight. Both instrumental groups experience a metamorphosis of phrase contour, moving from jagged motion to uniform descents, and climax with rapid cascades. Orchestration gradually thins and rhythm slows in preparation for the repose—a perpetual motion of decorated oscillations between the 11<sup>th</sup> and 13<sup>th</sup> partials, played by the flutes.



**Example 10. Spiral Ascent, Second Exhalation (from Two Bars after Rehearsal 28 to Rehearsal 31).**

*Episode 3* (Rehearsals 34 to 46)  
Inhalation (Rehearsals 34 to 40)

The whispering flute duet of the repose elides into the third inhalation, where Grisey weaves a complex tapestry by additive synthesis. The third inhalation features short melodic fragments with rising and falling contours. These fragments trace in pitch the shape of periodic amplitude oscillations that occur in the partials of the trombone spectrum. (See **Example 11**.) Continuing the pattern of register descent in the inhalations, Grisey reverses the entrances of partials by inverting the spectral envelope, slowly thickening texture by a process of high to low frequency accumulation.



**Example 11. Sine-wave Contour, Third Inhalation (Rehearsal 34 to Two Bars before Rehearsal 38).**

Microtonal inflections and grace notes begin the transformation to inharmonicity. Although octave transfer of partials controls the majority of dissonance, the first non-harmonic tones are absent from the opening spectrum (e.g., the clarinet C, two measures before Rehearsal 39). Throughout the section timbre and dynamics also expand, complementing the process of gradual inharmonicity.

#### Rupture (Rehearsal 41)

The vast majority of sections in *Partiels* elide through like material. Inhalations always begin in a high register and descend to the bass where exhalations then reverse the process and ascend. Slow evolutions of perceptual change provide a series of aural “dots” by evoking memory of the immediate past, and are vital components of Grisey’s musical discourse (see the discussion of *difference*, above). Music consisting of only gradual transformation, however, might cause a listener to blur all events as equally important, or equally unimportant, “and all that emerges is a hazy memory of the contour of the sound’s evolution” (Grisey 1987: 273). Structural markers are important to Grisey, and repetition is one method he employs to make such markers. Another method used by Grisey is sudden contrast. It has the opposite effect of repetition, displacing memory and bringing attention to the present.

The rupture at Rehearsal 41 is a contrast of the recent and a reminder of the past. The music is not a carbon copy of previous material, but is similar enough in gesture, register, volume, and length to evoke the climax of the second inhalation. Register dramatically compresses to extremes of wind and accordion tessitura as four rapid scalar descents burst into the piece. Rhythm also compresses as uniform 32nd-note cascades replace out-of-phase melodic fragments. The effect of the rupture, therefore, is contradictory. While the similarity to the climax of the second episode reminds one of the climax of the second inhalation, the sudden break from process-generated material shocks the listener to the present of the unexpected.

#### Exhalation and Repose (Rehearsals 42 through 46)

A massive chord strikes 12 times in homophonic rhythm after a rising arpeggiated flourish spaced over several octaves. Over the course of the third exhalation, harmonicity replaces inharmonicity and rhythm becomes increasingly aperiodic as chord members slowly move out of phase to become individual points. With the exception of the last three notes of the

bass, which leap from the second to the third, and finally fifth partials (E, B, and G $\sharp$ , respectively), pitch shifts primarily by semitones in a contracting wedge shape. Midway through the passage, the composer adds microtonal variation with small glissandi that carry over into the following section, adding slight distortion to the otherwise harmonic repose. (See **Example 12.**)

The musical score for Example 12 consists of two staves. The top staff is labeled '15va' and the bottom staff is labeled 'Brass & Strings'. The key signature is one flat (B-flat). The score is divided into measures corresponding to Rehearsals 42 through 46. Rehearsal 42 is marked '15va'. Rehearsal 43 is marked '43'. Rehearsal 44 is marked '44'. Rehearsal 45 is marked '45'. The score shows a series of chords and glissandi (1/8 gliss., 1/8 gliss., 1/8 gliss., 1/4 gliss.) across the staves.

**Example 12. Wedge-shaped Harmonies, Third Exhalation (Rehearsals 42 through 46).**

*Episode 4* (Rehearsals 47 and following)  
Inhalation

The glissandi of the previous exhalation and repose continue to the end of the piece. Although some partials transpose down by octave (e.g., the accordion B, four measures before Rehearsal 48), most partials simply disappear, supporting Grisey's assertion that the elision between *Partiels* and *Modulations* is silence (Grisey in LeLong 2001: 12). The lower partials, however, remain, and it is from these that the glissandi weave guttural clusters that grudgingly sputter to a halt as the piece transforms from absolute music to performance art, setting the stage for the intermission, but not the final bow.

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## DISCUSSION

**Audience #1 (Cornelia Fales):** Is he actually writing out the difference tones, or does he expect them to be perceptual?

**Chris Arrell:** He's actually writing them out, and if it's below 20 hertz, he writes it as a rhythm.

**Audience #2 (Alper Maral):** We are dealing with accurate pitches and there almost the whole orchestra is playing with vibrato, it's a bit confusing. In the last example, we are dealing with, well not maybe in this part of the

music, but in general if we deal with this kind of accuracy for partials or overtones or whatever, pitches, at least ...

**CA:** Oh, and they're playing vibrato. Yes, it's the same thing as additive synthesis, like the very beginning of *Partiels*, which is supposed to be a representation of the trombone spectrum. Every instrument is playing what would be a frequency of the spectrum. So, it's spectra of a spectra, it's the same thing, it's a complex sound of a complex sound, and vibrato makes it even more complex. It's just an analogy; it's not supposed to be a trombone spectrum.

**AM:** But then what is the sense of this detailed or analytical approach towards these ...

**CA:** Good question. What I wanted to do with my dissertation was, as opposed to what I had seen for analyses which are introductory articles which say, here's an example of ring modulation, that's 20 measures, here's an example of additive synthesis, that's three measures. Okay, that's it. What I wanted to do was go all the way through and figure out how he composed it. I'm not saying that I did, that I figured out everything, but I wanted to do something that tried to account for everything. Here I'm talking about composition, not necessarily, I suppose, what you do with vibrato.

**Audience #3:** I totally agree with you. I actually heard a recording the Oscar Schoenberg Ensemble made, and it's amazing. I hope it will come out, the entire cycle. I totally agree with you that it [should be played with vibrato].

**AM:** By the way, not to be misunderstood, my criticism is not towards your point, but to the whole branch of the interpretation. From the beginning on, we were listening to several examples of so-called spectral music, and as a composer, and at least somehow a performer, I do know what people expect by use of eighth tone or sixth tone and what bad intonation and what vibrato are sometimes used for. One has to be more careful about using these kinds of informal or traditional inaccuracy techniques.

**CA:** Don't you think that Grisey would have written non-vibrato in the score if that's what he wanted?

**AM:** For sure.

**CA:** But I don't think he did. I would expect him to write, "Don't play this vibrato." With this recording, it's hard to say, because this recording was made after he passed on. But there is another recording on LP, I can't remember who it's by, that was made when he was alive; it does sound quite different.

**AM:** She mentioned such a thing.

**CA:** Is that what you mentioned? Is *Dérive* on the other side?

**A#3:** No, it's a recording just made. It was made last year, and I hope they'll bring it out.

**CA:** I'm not sure how I feel about that because it's already a ....

**A#3:** If you hear this recording, you'll love it, really. I don't want to make too big a discussion, but we also have to find out how to play this stuff. It's all relatively new, but there's hope.

**CA:** At least here, I'm not so sure about the States.

[At this point there followed a discussion of score examples; we have omitted that discussion, as it repeated what was covered in the paper. ]

**Audience #4 (Matthew Goodheart):** I'm just curious about the tuning issues. I don't quite know how to form the question because I don't really know the piece that well. But this breathing between the sixth tone and the half tone, can you talk about that, or why? What kind of tension and release is created through that, or is there some other kind of cultural dialogue that he is dealing with, equal temperament history, or something like that?

**CA:** The sixth-tones are only as close as he felt he could get to whatever frequency it was. As inhalations progressed, and as you get to more of what he viewed as dissonant chords, perhaps he just felt like it wasn't necessary to throw in the sixth-tones any more because it's already dissonant. Perhaps there's something to what I'm saying about him thinking in terms of pitch classes as well as sixth-tones.

**MG:** If the half-tone tuning, especially if he does this half-step thing that you described here, which is so evocative of traditional, equal temperament harmony, is there some ...?

**CA:** He is thinking in terms of consonance and dissonance.

**MG:** Why does pitch class enter into it, then, if he's constructing a piece based on this harmonic spectrum?

**CA:** That's a good question. You know with *Périodes*, there's much more of this stuff that I just showed, many more examples where you can definitely see that he was thinking in terms of pitch classes. My guess is just that as he figured out a system, that you know what he had going before he started doing spectral stuff kind of gets less and less, although I'm not sure, because I haven't analyzed *Contrechamps*, which is his last piece. But that's my guess, that he was just kind of figuring it out. Does that make sense?

**MG:** I guess, I just wondered if it was some kind of additional tension in the piece that he was playing with, but I don't know.

**CA:** It could be.

**Audience #5 (David Matthews):** How do you fit the ending of the piece, with the noise—the various noisy sounds and the very deep tones in the contrabass clarinet ...?

**CA:** The ending of the piece is not harmonic and it's not periodic; it's very low and there are a lot of noise elements. *Modulations* starts with an inharmonic chord and eventually becomes harmonic, and there's an intermission between. So I think what happens is that this inhalation continues on into *Modulations*, the next piece, and is gradually resolved. Some scholars do something like this [shows example]. [Jean-Baptiste] Barrière does something like this, these little increases in tension, and then he kind of says [?]. That's a link.

**Audience #6 (Michael Ellison):** Is what you're considering inharmonic in the piece everything outside of the E series?

**CA:** Yes, but there are states of that. Something can be more inharmonic than something else.

**ME:** Right, so these whole notes were inharmonic in relation to that and not necessarily with the bass.

**CA:** Right, and that E and that spectrum are for the whole cycle. That's what he talks about, that's inharmonic, and that there can be states.

**ME:** Have you worked out any way of describing degrees of inharmonicity?

**CA:** There are two poles, a harmonic spectrum and white noise, and all the states in between. Grisey talks about *la difference*, which means the perceptual difference between two events. For example, two chords that are only one note apart but otherwise the same; it's not much of a change, not much difference. If they share nothing in common, it makes a lot of difference. All of these are processes, so if you can predict the process there is more tension in it than if you can't. That's exactly what Murail was talking about today. A lot of this early spectral stuff is criticized because it's too linear. So stuff like this starts to happen, and all those other things that Murail spoke about, the reordering of tiles, or skipping steps, or speeding things up, or so forth.

**A#4:** Is there a difference between monophonic and inharmonicity?

**CA:** I don't know; the definition that I know of monophonic is a single line. Oh, I see what you're asking. Sure, yes, the very first piece is for viola solo. It's got to be monophonic [?] a couple notes and they happen, throughout there is a lot of single-line stuff, and if the single line goes outside of the series, the same thing. Yes, that's good because I've been focusing so much on harmony but the same thing applies for the horizontal dimension as the vertical.

**Audience #7 (Onur Türkmen):** These processes like pitch to noise, and sixth-tone to the half tone, how do they connect together?

**CA:** By processes, so in the beginning there are all these processes that happen at the same time. This is me, [shows example] so don't blame this



on Grisey, but all this other stuff ... they connect because tension increases as you go this way. That's how they're all similar. This is not part of that, this is just something that happens, always, except for the last exhalation, it doesn't happen there, but in all the other, sorry, all the other inhalations it goes to half-step tunings.

## THE MUSIC OF PHILL NIBLOCK

Michele Rusconi

I will talk about the American composer Phill Niblock (who recently turned 70) and in particular about his composition *A Trombone Piece*, which we will listen to later on.<sup>109</sup> First, however, I must talk to you a bit about Niblock himself, since he is not as well known as he could or maybe should be. As a matter of fact, he has been able to reach a larger audience only in the last few years, which includes Europe and Asia. As for himself, he thinks that right now, among DJs, noise composers, drone-based music composers, and all those composers who use power books and who often come originally from the visual arts, his musical approach has more meaning today than it might have had at any time before. Among the younger generation, for example, Brian Eno is someone who claims to have been influenced by Niblock; another is Glenn Branca.

Phill Niblock's music requires such specific performance and listening conditions, that he originally, and for a long time, thought that the only way to listen to his work properly was in the form of a live concert. I will talk about these particular conditions in depth later. Niblock wrote and performed many very interesting pieces in previous years, played many concerts, but did not produce any compact discs. Eventually he saw the disadvantage (also commercially) of that, "The music just didn't get out!" he says, changed his mind, and in the last few years made quite a few CDs, many on his own label XI (for Experimental Intermedia). (XI issued a series of compact discs highlighting the music of contemporary artist/composers whose works are original and galvanizing. The intent of XI is to extend the experience of these engaging and pioneering works beyond the performance

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<sup>109</sup> [At the conference, Michele Rusconi's presentation was followed by a memorable performance of *A Trombone Piece*, which filled the vast stone hallways of the four-storey, former Ottoman armory where many of the conference events took place.]

space into the home). As a precaution, Niblock sometimes still adds a little advice in some of the CD booklets; in one, it actually says, “PLEASE PLAY THIS RECORD LOUD.”

Back in 1968, Phill Niblock joined the Experimental Intermedia Foundation in New York—as the name says, a multi-media organization—and a few years back, bought a couple of houses in Gent, Belgium, and installed there another Experimental Intermedia. Niblock has been trying for years to establish a net of connections between the cultural centers of the United States and Europe, and every year he spends several months traveling within Europe, establishing contacts and performing.

In New York, Experimental Intermedia turns out to be a performance space basically, located in SoHo at the border to Chinatown, in a huge loft where Niblock has lived for the last almost 40 years, and where during these years he continually organized concerts and huge, famous parties. It became a sort of hang-out for many artists, not just musicians, also dancers and visual artists who would be able to perform their works there. They are Steve Reich, Elliott Sharp, Alvin Lucier, and Laurie Anderson, to name just a few musicians.

The Experimental Intermedia space in New York is the place where Niblock prefers to have **his** music performed. There he has the right equipment and a good acoustic, and knows how the room reacts to the amount of public he gets. In that space he organizes a Niblock music marathon every year around Christmas time, playing only his music, which lasts for about six hours, accompanied by his simultaneous playing of video clips. I will talk about those later.

Niblock was born in Indiana in 1933, and came to New York as a young man only in the 1960s. He came as a photographer (for a while he made album covers for the Duke Ellington Big Band!), he did a few experimental films, and he moved at first mainly within the scene of the American minimalist visual artists. He was tremendously inspired by people like Donald Judd and Sol LeWitt, and shares and agrees with their artistic ideas and concepts. Niblock understands minimalism not so much as a reduction of artistic or musical means, not as a term of quantity (minimalism versus maximalism), but as an expression of a movement created by these artists by whom he was so influenced. Again, in his words, “minimalism is about stripping out a lot of the past,” and “... about getting rid of the typical musical structures” (meaning typical European musical structures).

Until Niblock got to New York, he had had exactly six miserable weeks of piano lessons as a child, and that was and will be all the lessons he will ever get. He told me during a conversation in New York, “I’m a complete

non-musician. I consider myself a composer but not a musician. I come from a totally non-musical standpoint; I don't think like a musician and I don't have musical concerns."

Phill Niblock composes a sort of melodious surrounding, collage, environment, or ambience, which he records on tape and plays through four loud speakers placed diagonally across from each other. For the tape, he uses long tones, so-called drones, which lay very close to each other, microtonally close, and which out of this situation create the effect of overtones. Niblock calls those superimpositions or overlapping situations "fields of sound," and his music basically consists of continuously slightly changing, and always shifting fields or streams of sound. The music does not go anywhere and there are no hidden meanings anywhere. Everything stays at the surface and it is only and exclusively about sound.

During performance the tape will be played at an extremely loud volume (but without distortion) so the material can react better and stronger to the given acoustic in the room. The acoustic conditions of a given room are essential to Niblock's music; I would even say that they are part of the composition itself, sort of built in. Because of the always-different acoustic conditions of different concert halls, the music does not always sound just like the composer wishes, even though after years of experience he knows well how to adjust to a given situation and how to prepare himself for it. Actually, not many concert halls fulfill his high demands. "I want cathedrals!" he says. In addition, the sound quality depends on the quality of the equipment at his disposal: speakers, CD players, amplifiers, etc. For instance, Niblock prefers multiple high-end speakers and rooms with a lot of echo.

I would like at this point to say something somewhat outrageous to make a point in terms of acoustics: a Mozart Symphony or a Beethoven string quartet will always sound more or less the "same"—including horrible players and very poor equipment—meaning it will always be recognized as that particular symphony or that particular string quartet. In other words, the **identity** of those pieces stays intact even through a very bad recording or poor performance, and we may very well criticize their rendition, but we will always be at least capable of confirming their identity. This we cannot always do with Niblock's music: most sound events are not contained in the score, they are not even on the tape, but only come into existence once they are left to float in the room. As a result, what is heard live often has nothing in common with the original sound on the tape. All the interactions take place in space.

Nothing at all happens with headphones. The two sound sources, each ear separately, do not have the chance to meet and there is no space where the sound waves can interact. They both operate separately and play “only” and exactly what is on the tape—not at all the desired effect! Once the correct acoustical conditions are given, however, immediately a mass of overtones develops, sometimes buzzing and hovering as high frequencies like clouds high up in the room. Because the notes lie so close to each other, and because they incessantly rub on each other, harmonic beats are heard, and usually already after a few seconds, the whole mass of sound starts to vibrate. The closer the tones lie to each other, the faster the harmonic beats will pulsate. Now everywhere in the room, wandering clusters emerge—little **microtonal puddles**. With high volume, the tones lying next to each other generate a mass of combination tones.

For the first few minutes of a recording, the sound is usually somewhat thin and seems to be quiet and calm, not moving. Only after a while the rising sound masses begin to pile up and put themselves one on top of the other, almost like a piece of architecture. Add to that the continuous buzzing and humming of the clusters, which will increase and decrease according to the room.

The standpoint of each listener determines what he or she will hear. That effect is of particular concern to the composer and he usually encourages the public to move around freely in the room, especially when the concert takes place in his loft. One must listen to Niblock’s music loud. Only then can certain acoustic phenomena be heard. You know that even a single frequency played loud enough can produce overtones all by itself. For instance, Niblock talked to me about an old cello piece of his where, at medium volume, only the original sound produced from the cello could be heard. When he increased the volume, that tone plus all the over tones could be heard, and at an even louder volume, the tone produced by the cello entirely disappeared and only the overtones were left to hear.

Whenever possible during a performance, live musicians play alongside the tape with their corresponding instruments. They are either standing on the stage or playing while wandering around the public. Their instruments are often not amplified and are hardly audible, so their presence naturally serves also a visual purpose. Then again, since their voice is not in the mix, they can be heard somehow, and they create little acoustical islands here and there, little pools that exist but do not influence the whole mass of sound in the least. The musicians are not really soloists either; they only play long tones, after all. Their purpose is to disappear within the bigger sound and, wherever they stand at a particular moment, to change only slightly and

subtly their immediate sound pool. They do not really improvise and only play those long tones that correspond with the “tonality” of the piece.

Every combination of frequencies creates other overtone harmonies, which are difficult to foresee while composing. Then, if two waves are exactly superimposed, the volume will increase, also something you will hear when listening to a Niblock piece; the sound swells in one moment, decreases in another. One can therefore say that Niblock composes really only the conditions for a piece but not the result. What one eventually hears does not develop until it gets into the space.

When I first met Phill, I thought, of course, that he knew everything about acoustics, and that he had studied all the interesting phenomena his music was able to create, and I was at first shocked when I learned that he did not(!), and that his entire work was based literally on experiments and was entirely empirical. “I’m completely stupid,” says Niblock. “I don’t work as a scientist, and I’m only interested in one phenomenon, and that’s long tones that are close to each other.” Niblock is not a scientist like Alvin Lucier, who loves to study environmental systems, or systems that occur in nature. In contrast to Lucier, Niblock just uses those systems, almost frivolously, if you like. His musical decisions are mostly based on an empirical procedure. His control over the musical material is less in comparison with Lucier’s, because the acoustic space is fundamentally important for his work and can change any piece in an unforeseeable way. Besides, Niblock only works with acoustic instruments. (Interestingly enough, there is a concert planned in Zurich with music by Niblock and Lucier for March 2004.)

I questioned Niblock about how he felt about losing control over his works, but he seems to like that risk and the fact that something is heard that does not even exist on tape, but is only made possible by special, spatial conditions. I think Niblock composes in a way that no longer guarantees results that can really be calculated. But then he claims that he is seldom surprised by the results and never, so far, had to make any changes after listening to a piece. He is even surprised how most of the time the music does indeed sound just how he had imagined it before.

Michael Nyman says about Niblock’s music, “The uncertainty in the performance ensures that two versions of the same piece don’t have any audible facts in common anymore.” During a conversation with Arthur Stidfle, Niblock said, “I never make a piece because I heard how the combination of some tones sound. I also never put tones in a certain manner just to hear how they sound. I make the score, the whole and complete score, before I synchronize the tones on tape.”

Now I should explain how those tapes are generally made, and then afterwards talk specifically about the score and tape of the piece we will hear, called *A Trombone Piece*—a minimalist title of course. First, to do a tape, Niblock has to go into the studio with his musicians and record the material, for which there either already exists a score or out of which the score has yet to be done (which is what happened in *A Trombone Piece*). The musicians play exactly given frequencies as long tones for a few minutes, mostly put only a few hertz away from each other—for example first a session of 220 Hz, then one of 119 Hz, another of 221, etc. Niblock records them on several tracks, one for each musician. (For *A Trombone Piece*, done in 1977, he only used eight tracks. In his last piece, *EZAZ* from 2002, he needs 72 tracks, and the effect is a gigantic mass of sound, maybe only comparable with the works of Edgar Varèse, whom he resembles just a little bit with his architectural constructions, even though he does not count Varèse among his influences.) Once the recording is done, he deals with the material differently every time.

As I said earlier, Niblock uses several recording methods. For *A Trombone Piece*, he needed only one musician, a trombone player, and he went into the studio with trombonist James Fulkerson. With the help of a frequency analyzer, which allowed him to define exact pitches, Niblock created sine waves and put those into an oscillator. Fulkerson, the trombonist, then had to tune his instrument to those chosen frequencies, always A and A $\sharp$ , and in order to do so connected the microphone to the oscilloscope. As soon as he played a tone (it should be *mezzo forte*), an image formed on the screen of the monitor, a pattern that indicated precisely whether the tone played corresponded with the pitch of the sine wave or not. If the tone was too low, the pattern would rotate in one direction, if too high, it would move in the other direction. If the played tone was exactly correct, the image would not move, and since Fulkerson had the monitor always in front of him, he could orient himself all the time. Therefore, for him, the only reference to a given pitch was not a written score, but the oscilloscope itself, and in order to match the pitch, he had to adjust visually to the image. The result was a pool of pitches tuned to the oscilloscope. Niblock then assigned a fixed time measure to each pitch. For instance, for 220 Hz the time length was always 1'45", for 119 Hz always 1'15". All the collected samples were cut to a desired time length. Niblock used the whole material but cut off the breathing spaces. There is a short silence after the tone has faded before the next one is heard.

While recording, Niblock used two four-channel tapes, and then mixed them down to one track each. Very important, and in all the pieces used in

the same fashion, is the **panning**; of the eight channels, four will be turned all the way to the left, the other four all the way to the right, with nothing in the middle, to avoid any spectrum. In the end mix again, the remaining two channels will be panned as far away from each other as possible. You cannot therefore really talk about stereo anymore; it is more like a question of two separate channels. Niblock's intention is for all the acoustic phenomena to take place in the space, and to keep the sound sources completely separated and have them mix only in the room. Which of the eight channels will eventually be mixed together is a matter of design; in this case, they are 1,3,5,7 and 2,4,6,8.

Niblock proceeded differently with a piece called *Five More String Quartets*, which he wrote between 1992 and 1994. He recorded the quartet five times. For each recording, the musicians played long tones for 25 minutes in real time, whereby they were never able to see the score. The score was done before the recording in this case, and then Niblock made a tape of sine waves that corresponded approximately to the score. For this, he used a sine-wave generator with a frequency counter. For each pitch, there is a recording that has a certain length. On the tape are sine tones, which are played to the musicians through headphones while they are playing. The musicians then play with the tape in real time and constantly adjust their pitches by listening to the tape. Since the sine tones constantly change, the musicians also have to retune accordingly all the time. If a tone disappears in the headphones, they have to prepare themselves for the next one, and tune to it immediately. The musicians went into the studio and recorded one after the other. Niblock recorded each member of the quartet five times, resulting in a total of 20 tracks.

Niblock used yet a different procedure for *EZAZ* from 2002, for three small ensembles, tape, live electronics, and no conductor. While performing, one group plays E, another G, and the third a B moving slowly towards B $\flat$ . The mass of sound plus the overtones make it almost impossible to hear an E-minor chord.

During performance, the musicians, according to their group, play microtonally around their pitch and at the same time try to blend into the sound that comes from the tape. They choose the octaves freely, but should choose where their instruments sound good. Each ensemble has two speakers placed in front of it. Synchronization with the tape is not necessary, but the blend-in should be smooth. They should start with *dal niente*, increase the volume to *mezzo forte*, and fade out again. The length is not given, but it should be long.



Niblock used the computer program Pro Tools to make the tape of *EZAZ*. He worked with 72 tracks: 24 tracks for each pitch, E, G, and B going to B $\flat$ . Later he mixed each group of 24 tracks down to two tracks, so that in the end, there are three times two tracks. These two remaining tracks of each pitch were burned to a CD (thus resulting in three CDs) and during performance are played alongside the playing ensembles, coming out through two speakers placed in front of the performers. So Niblock needs in total three sound systems with three CD players and six speakers.

To create the tape, Niblock used a number of samples. He went into the studio with the ensembles in July of 2002. For each instrument, he recorded three octaves. Most are stereo, but a few are mono. In addition, he divided the strings into muted and not muted, which gave the samples an additional color. Also for the strings, there are long and short samples, either just one bow or repetitive soft bow changes. The saxophone only plays long tones and Niblock cut out all the breathing spaces. The musicians played all combinations of samples one after another: long, short, muted, high octave, low octave, etc. In the end, Niblock put all the material into the computer, where he made a clear audio list of the samples. Then he cut and rearranged them inside Pro Tools along a time axis. Only when he finished that, did Niblock have a score.

I want to go back to *A Trombone Piece*. As in all his pieces, Niblock uses the material in a very economical way. Besides the microtonally back and forth swaying A's and A $\sharp$ 's, there is hardly any development or dramaturgy. The harmonic beating increases towards the end of the second third, slows down again towards the end of the piece, and thins out. It was recorded in 1977 with tape and live trombone, and lasts exactly 22 minutes and 23 seconds. You can hear a tape playing eight channels mixed down to two, divided into four loudspeakers. (Not possible today is the presence of a live trombonist.)

You can hear a continuous sound field for 22 minutes, and even though there are pauses on the different tracks, you will not hear them. They are placed in such a way that you hear only how the sound gets thinner or thicker at times. There is no general pause for all tracks at the same time. Thin in the beginning and again towards the end, it has its maximum density somewhere in the middle.

Each channel, as I will show, has its own structure and design. The channels neither start nor stop exactly at the same time. The first two tones ring at time 0 on the time axis in channels two and six, at 110 and 220 Hz respectively. The piece ends with 110 Hz only, in channel seven. The score shows eight channels simultaneously, from left to right. Numbers on top of

the cross beam signify the actual time, and numbers between the beams show the length of the played frequency, which is notated below the horizontal line. Empty spaces indicate pauses.

In the original score, I saw some irregularities on the time axis, and I permitted myself to make a corrected score in the computer. The main tone in the piece is an A, which shows up in three different octaves: 55, 110, and 220 Hz. To each of those “pure” pitches, Niblock added three equally distant “impure” pitches, which he calls “dissonants.” They are for the octave of 55 Hz: 57, 59, and 61 Hz. For the octave of 110, he adds 113, 116, and 119, and lastly, for 220, another 224, 228, and 232. In total, he uses 12 different pitches, four pitches in each octave. For each pitch, there is a given length. The only irregularity is that there are 12 different pitches and 11 different lengths, since 110 and 113 Hz share the same length. Maybe one of Niblock’s jokes is to confuse anyone who tries to analyze the piece.

Once I established those facts, I tried to analyze how each channel was designed. I made lists of different parameters. I compared how the pitches were represented differently on each track; which octaves were how, how long, and where represented; and were there any noticeable tendencies and their deviations. It seemed, however, that whenever I had established some rule or pattern it proved erroneous, misleading, and deceptive. I even cut the score into 10 equal slices to have a better look, and again I could probably talk for hours about how each track is designed, but it seems futile. Maybe there are more dissonances in one channel than in another, maybe shorter pauses in one or lower pitches in yet another, but so what? Niblock could have interchanged the tracks or taken other structural changes, it would probably not make much of a difference.

I was a bit frustrated during and after analyzing three pieces of Niblock, because there was no system I could detect, and if there was one, all it would do was persistently avoid a system. Then again, I was not sure whether I was dealing with a concrete and organized desire to avoid and destroy any connections, or if it was just the casual result of an experiment. Clearly, however, there was a total absence of any connections. There is no order, no tendency, and no pattern. No connection between the pitch and its corresponding length, it all just “happened that way.” The duration of the pitch 224 Hz is 2’25”. This proportion has no consequences whatsoever. It does not mean anything at all. However that may be, Niblock’s music is of an empirical nature. He makes his esthetic decisions within the sounding material itself. Although he might well call himself an idiot, the music sounds great nevertheless.

Phill Niblock does not remember what exactly made him do what he is doing, but he says that Morton Feldman's piece *Durations* (1960-61), an early piece without melody or rhythm, triggered his desire to start composing. "That piece was in a way a permission for me to make music," he says.

All his pieces are drone pieces, "I always made long tones, and that's the only thing that ever interested me." Which is the reason I can choose any older piece of Niblock I want; the fundamentals of his music have not changed much at all over the years. There is the economy of the material, close-proximity layered tones with exact pitches, recorded by acoustic instruments, multi-channeled and piled up. There is a constant density and a limited amount of pitches.

Not surprisingly, Niblock's first piece was written for organ. The instrument is suitable for long tones and is rich in overtones. During the performance at that time, Meredith Monk played the organ, long tones of course, while slowly a tape—also playing long organ tones—was blended in. For a while, the two sound sources coexisted side by side, and then Meredith got up and sat in the public while the tape kept playing through the speakers.

In a way, Niblock seems to circumnavigate music history. He and his American contemporaries are of the 20<sup>th</sup> century, but yet they seem to stand outside of history. There is no reference to the past. Niblock did not find inspiration in traditional European music, which he likes nevertheless, and his music is not based on it; therefore, there is no argument with European music history.

Moreover, unlike other composers who saw themselves inside some American history, such as Charles Ives, Carl Ruggles, or Harry Partch, Niblock's reference is only John Cage, whom he calls the father of us all, and who said, "Every sound is unique and not informed about European history and theory." Niblock also never looked for inspiration outside of the traditional European music, for example to Asia.

Maybe, at least theoretically, his music has something in common with La Monte Young's, who in the 1960s stimulated Niblock. Usually Young's sound fields are much more constant, however, while Niblock's sound fields move and shift all the time. Also, unlike Young or Partch, he is not interested in other tuning systems.

There is an additional element to a Niblock concert I have not talked about yet: Niblock's videos. Those films play simultaneously with the music without the two being in any way connected to each other. There is no coordination between image and sound. The films usually show people from non-industrialized countries working manually. Some mend fishing nets in a

port in Hong Kong, others repair boats or sort out clams. The camera is directed mainly towards the anonymous movements of hands and feet, while the heads often stay outside the picture frame.

Usually several films play at the same time at a concert without being synchronized among themselves or to the music, and therefore they keep their independence. Niblock's concern was the movement. He says, "I was searching for a movement which is dance but without a dancer. I found that looking at the manual work of traditional cultures: movement detached from content."

I end with a quote from James Tenney, mentioning Niblock: "... not famous, established figures, but lone voices, radicals, people who have resisted the political, social, and cultural currents of their times."

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## **NORTH AMERICAN SPECTRALISM: THE MUSIC OF JAMES TENNEY**

Robert A. Wannamaker

### **INTRODUCTION**

Since 1971, the works of American-Canadian composer James Tenney have exhibited many of the technical and stylistic earmarks of what has since come to be called “spectral music.” In particular, his *oeuvre* includes very early examples of instrumental music involving orchestrations of the harmonic series and of pitch relationships derived from it, “instrumental synthesis” based on spectral analysis, the orchestration of electro-acoustic sounds, structural concepts derived from acoustics and psychoacoustics (including Shepard tones, difference tones, harmonic fusion, and residue pitches), gradual formal processes, and a general preoccupation with the phenomenology of sound. This paper provides an introduction to this important and under-recognized body of work, relating it to an American phenomenological aesthetic descended from John Cage and Harry Partch. Tenney’s work is considered as representative of a previously unacknowledged indigenous North American school of spectral music composition that also includes such composers as Larry Polansky and John Luther Adams.

### **PRECEDENTS**

Among James Tenney’s compositional output since 1971 are over 40 significant works that can properly be regarded as spectral music. His multifaceted explorations of perception in many ways parallel, in some instances anticipate, and sometimes interestingly contrast with musical developments in Europe. This paper considers Tenney’s work and its influence as representative of a significant and virtually unacknowledged tradition of spectralist composition whose technical and aesthetic roots are distinctly North American.

Tenney's spectralism is the product of a long and complex personal history reflecting his ongoing interests in both science and music. Born in 1934 in Silver City, New Mexico, his early academic studies included engineering at the University of Denver (1952–54) as well as piano with Eduard Steuermann at the Julliard School (1954–55), and composition and conducting at Bennington College (1956–58) with Lionel Nowak and Henry Brant, respectively. His compositions from this period betray the influences of Arnold Schoenberg, Anton Webern, and Edgard Varèse, as well as a characteristic pithiness and conceptual clarity.<sup>110</sup>

In 1961, Tenney earned a master's degree in composition from the University of Illinois at Urbana-Champaign, where he studied composition with Kenneth Gaburo and electronic music with Lejaren Hiller. His master's thesis, entitled *META + Hodos: A Phenomenology of 20<sup>th</sup>-Century Musical Materials and an Approach to Form* (Tenney 1988 [1964]), applied principles of Gestalt psychology to the perception of musical forms and has proven widely influential. During this period, he also played in Harry Partch's Gate 5 Ensemble, and Partch's harmonic theories (Partch 1974 [1949]) have been one inspiration, among others, for Tenney's own theory of harmonic perception (Tenney 1993 [1983]).

From 1961 to 1964 Tenney was employed as a member of the technical staff at Bell Telephone Laboratories (now AT&T Bell Laboratories) in New Jersey. While there, he composed some of the earliest substantial pieces of computer music and conducted pioneering research on algorithmic composition, psychoacoustics, timbre modeling, and computer sound generation, with Max Mathews.<sup>111</sup> The detailed technical experience that he acquired with acoustics, psychoacoustics, spectral analysis, signal processing, and information theory during this time period has informed

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<sup>110</sup> Most of Tenney's major works completed between 1960 and 1980 receive detailed examination in Larry Polansky's book-length analytical study of his music (Polansky 1983), which still constitutes the single most important scholarly resource for anyone interested in Tenney's work.

<sup>111</sup> Tenney's recorded musical works from this period are available as *James Tenney: Selected Works 1961–1969*, New World Records CD 80570. An analytical survey of these works is available in Polansky 1983, a version of which constitutes the liner notes to the CD release Polansky 2003. The composer himself has published analyses of these works and an account of his time at Bell Labs (Tenney 1969). Tenney wrote one of the very first publications regarding computerized sound synthesis directed towards musicians, which contains technical aspects of the research that Tenney conducted on sound synthesis and timbral modeling (Tenney 1963).

much of his subsequent compositional work, and his spectralist music in particular.

During this time, Tenney also studied composition privately with CHOU Wen-chung (1955–56) and informally with Carl Ruggles (1956–58), Edgard Varèse (1956–65), and John Cage (1961–69). Exposure to Cage’s Zen-related phenomenological attitude towards “letting sounds be themselves” (Cage 1961) had already made a strong impression on the young composer before this time. Tenney has said that “... people having difficulty with 20<sup>th</sup>-century music are not hearing sound because they’re not in a frame of mind to simply listen to sound for itself. That’s why Cage is indispensable ...” (Tenney 1984). In this attitude one finds significant commonality with the empirical orientation of the psychoacoustician, who also creates, attends, refines, compares, and contemplates sounds. The obvious difference is that for a composer such as Tenney the exploration of sound-as-heard offers not only an opportunity for conceptual refinement but also an affecting sensuous experience and an avenue to heightened self-awareness. An attraction, both intellectual and sensuous, to sound as a phenomenon—to differentiating, experiencing, and appreciating its facets, and to personally becoming more fully aware of how the perceiving self is constituted—would bring him to employ spectralist means in the exploration of timbral and harmonic perception.

During the 1960s, Tenney was peripherally involved in the Fluxus art movement and was also an original performing member in both the Steve Reich Ensemble (1967–70) and the Philip Glass Ensemble (1969–70). While his interest in gradual formal processes precedes his involvement with these so-called “minimalist” composers (appearing earlier in certain of his computer music compositions), his work since 1967 has frequently embraced unidirectional processes of the sort also recognizable in, for instance, Reich’s *Come Out* (1966). In particular, between 1965 and 1971 Tenney composed a series of ten so-called *Postal Pieces*, which he printed on postcards in 1971 and sent to his friends. Several of these simple but very effective little pieces exhibit such gradual unidirectional formal processes and also bear other proto-spectral features. For instance, *Swell Piece No. 2* from 1971 asks performers to sound A<sub>4</sub> (440 Hz), repeatedly entering *dal niente*, increasing in intensity, and then fading back out *al niente* in a manner rhythmically independent of one another. With sustained communal concentration, the intonation of the ensemble will progressively improve so

that successively higher harmonics of  $A_4$  will begin to ring out,<sup>112</sup> encouraging listeners to “hear-out” these partials within the composite harmonic spectrum.<sup>113</sup>

## EARLY SPECTRAL WORKS

Although Tenney’s *Postal Pieces* share a phenomenological orientation and the use of gradual formal processes with the more paradigmatic spectralist music he soon began writing, his experiences at Bell Labs in the early 1960s were probably a more direct precedent for this compositional development. Indeed, his next work was an orchestration of the Shepard-tone concept. Tenney knew of the associated phenomenon from his sojourn at Bell Labs alongside cognitive psychologist Roger Shepard—after whom the phenomenon is named—during the period of time when Shepard first investigated it.<sup>114</sup> In 1969, Tenney had produced an electro-acoustic piece based on the phenomenon entitled *For Ann (rising)*, and in 1971 he undertook an orchestration of that work.

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<sup>112</sup> Note that all pitch specifications in this paper follow the Acoustical Society of America’s pitch designation system, so that  $A_4$  is 440 Hz, the pitches in the octave including and above middle C are  $C_4$ – $B_4$ , and the lowest C on a conventional 88-key piano keyboard is  $C_1$ .

<sup>113</sup> The reason is that if the fundamental frequencies of two complex tones in a unison dyad are mistuned by a frequency difference  $f_2 - f_1$  (which will be the frequency of beating between them), then the  $n$ -th harmonics above these fundamentals will be mistuned by a frequency difference  $nf_2 - nf_1 = n(f_2 - f_1)$ . Thus, once the intonation has improved sufficiently so that the rate of beating between lower harmonics is no longer distracting, the beating between relatively higher harmonics becomes noticeable due to its greater rapidity.

<sup>114</sup> A Shepard tone is a collection of sine tones, separated in pitch by octave intervals, all of which are *glissad*-ing or stepping upwards together at a common rate in semitones per second. Each tone is individually subjected to an identical amplitude envelope such that it gradually “fades in” beginning at some given bass pitch, attains a dynamic plateau, and then “fades out” as it approaches a given treble pitch. The impression imparted to a listener is that of a tone rising continuously in pitch without getting higher; see Shepard 1964.



### *For 12 Strings (rising)* (1971)

The result was *For 12 Strings (rising)*, scored for two contrabasses, three cellos, three violas, and four violins.<sup>115</sup> In this work each instrument executes an ostinato consisting of an upwards *glissade*, but the instrumental parts are carefully dovetailed in both pitch and dynamic to give the impression of a collection of overlapping tones smoothly rising more than five octaves from F<sub>1</sub> to A<sub>6</sub> and separated by intervals of a tempered minor sixth.<sup>116</sup> The audible effect of the piece cannot be reliably assessed, since it has never been performed. If the electro-acoustic *For Ann (rising)* is any indication of what to expect, then the texture, although physically quasi-static, will prove audibly complex and unstable as the ear skips between voices, compulsively creating its own non-deterministic melodies and counterpoint despite the uniformity of the objective stimulus. *For 12 Strings (rising)*, while it addresses a specific phenomenon apparently not explored in other spectralist instrumental works, clearly bears many of the principal earmarks of spectral music as it is described in the literature (see Fineberg 2000). It is, for instance, a deliberate orchestration of a particular spectrum, undertaken with attention to phenomenology rather than semantics, and exhibits a process-form and expanded temporal scale that facilitate exploration of the music as a phenomenon. Furthermore, like many other spectral compositions, it is an orchestration of electro-acoustic source material.

### *Clang* (1972)

Tenney's next work was *Clang* for orchestra, of 1972. In addition to the formal and aesthetic features already observed in *For 12 Strings (rising)*, *Clang* exhibits several more that are also characteristic of much other music described as "spectral." For instance, it takes the harmonic series as a point of reference and employs microtonal tunings in order to approximate

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<sup>115</sup> Scores for those of Tenney's works that were composed before 1986 are available from Smith Publications. Works composed during 1986 or thereafter are available from Frog Peak Music or the Canadian Music Centre. As of June 2006, a fairly complete list of Tenney's works to July 2002 as well as a discography and bibliography are available on the World Wide Web at The Living Composers Project.

<sup>116</sup> Note that the outcome differs from a conventional Shepard tone, in which the interval between sine waves is an octave. In the electro-acoustic *For Ann (rising)* this difference results in a correspondingly more complex phenomenon, with combination tones, beating and ephemeral artifacts audible in the musical background.

intervals within that series. It also applies filtering-like operations to pitch materials. Finally, a distinctive relationship between pitch sets that is observable in many purportedly spectralist works is found in *Clang*. Suppose that by the term “conceptual fundamental” we refer to the highest pitch, sounding or not, of which all tones in a given pitch set may be regarded as harmonics. Then an important structural principal appearing in *Clang* involves the use of successive pitch sets whose conceptual fundamentals progress by octaves. Tenney’s structural use of such relationships in *Clang* predates their use by such composers as Gérard Grisey, in whose music these increases or decreases of the conceptual fundamental by octaves François Rose (1996) associates with motion towards “harmonicity” or “inharmonicity,” respectively.

*Clang* is 15’30” in duration and successively presents two gradual processes, the first accumulative and the second dissolutive. These are separated in time by a single *fortississimo* percussive attack or “clang,” with similar “clangs” initiating and concluding the piece. The pitch gamut employed is restricted to the first eight prime-numbered harmonics of an E fundamental and their octave equivalents, which together constitute a sort of just-intoned octatonic scale. The intonation of these pitches is approximated using tempered quartertones.<sup>117</sup> The score is divided into 17 sections cued by the conductor, which indicate different sets of pitches available to the players using a scheme that the composer dubs an “available pitch process.” The score to *Clang* describes the process as follows:

... the notation indicates available pitches to be played by sustained-tone instruments (including rolls on the percussion instruments) in the following way: each player chooses, at random, one after another of these available pitches (when within the range of his or her instrument), and plays it beginning very softly (almost inaudibly), gradually increasing the intensity to the dynamic level indicated for that section, then gradually decreasing the intensity again to inaudibility ... After a pause at least as long as the previous tone, each player then repeats this process. (Tenney 1972)

Here, then, is an important attribute distinguishing *Clang* and many of Tenney’s other works from most European spectral music: a post-Cageian espousal of indeterminacy with regard to certain musical features such as timbre and texture, albeit carefully constrained so as to ensure that the

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<sup>117</sup> The demanded accuracy of intonation has increased over the course of Tenney’s output, stabilizing at an ideal tolerance range of plus-or-minus five cents in the mid-1980s.

resulting variety displays desired aspects of uniformity and evolves in a deliberate fashion.

The opening accumulative formal process begins from an available pitch set comprising  $E_4$  alone. The compass of this available set expands in stages, almost as though the bandwidth of an ideal bandpass filter were being gradually increased to pass more and more frequency components. A massive dissonant noise-like sonority thus gradually unfolds, its texture and timbre constantly fluctuating as instruments enter and leave. The expansion concludes and the second “clang” sounds when all pitches in the just-octatonic set between  $E_1$  and  $E_7$  are available.

At this point, the conceptual fundamental of the entire available pitch set is an infrasonic  $E_3$ . The available pitch set in the next section retains only those pitches regarded as harmonics of  $E_2$ , deleting some of the lower pitches from the available set so that the conceptual fundamental rises by an octave. The conceptual fundamental is similarly raised by one octave in each successive section; that is, the fundamental of the available pitch collection progressively rises so that the texture grows increasingly consonant and recognizably “harmonic.” This transition from a noise-like sonority to a tonal (in the sense of “pitched”) sonority provides the large-scale formal trajectory of *Clang*’s second half. Pitches in the pitch class E are treated specially insofar as they are not deleted from the available set, so that at the music’s close the sounding pitch collection comprises all of the E’s between  $E_1$  and  $E_7$ . As this conclusion is approached, the highest sounding pitches become perceivable alternately as discrete tones or as gradually fluctuating timbral colorations of the lowest sounding E ( $E_1$ ), since they all coincide with harmonics of this pitch.

**Example 1** shows two successive available pitch sets from the second half of *Clang*. For the first set (Section 9 of the score) the nominal fundamental is  $E_1$ . In the second set (Section 10), it is  $E_0$ . Accidentals in parentheses represent quarter sharps and quarter flats. Filled noteheads correspond to pitches that will be deleted from the available pitch set in the next section, when the conceptual fundamental will be  $E_1$ .

Like *For 12 Strings (rising)*, *Clang* was published but never received a concert premiere, although it was given a promising reading by the Los Angeles Philharmonic shortly after it was composed.

10. 11'30"-12'00"

11. 12'00"-12'30"

(basses hold their low E ( *f* ) from here on)

**Example 1. Two Successive Available Pitch Sets from *Clang*.** Quarter sharps and quarter flats are indicated using parentheses. (Copyright 1972 by Sonic Art Editions. Used by permission of Smith Publications, 2617 Gwynndale Ave., Baltimore, Maryland 21207.)

### *Quintext* (1972)

*Quintext*, also composed in 1972, is a suite subtitled *Five Textures for String Quartet and Bass*, of which the first, third, and fifth parts exhibit spectralist aspects. The fifth, entitled “Spectra for Harry Partch,” is a particularly remarkable construction that achieves very precise tuning of intervals in the harmonic series above  $F_1$  using an ingenious system of *scordatura*. The bass tunes its E string to this F, then plays odd-numbered natural harmonics on this string (up to the eighth) to which the other instruments then tune their open strings. Throughout most of the piece, the bass plays a drone on this open F, while the other instruments play only open strings and natural harmonics up to the seventh. In this way, very accurately tuned harmonics of  $F_1$  as high as the 105<sup>th</sup>, are attainable. Rhythm is notated proportionally but pitch is fully specified, with increasingly higher harmonics being gradually (but irregularly) introduced over the course of the piece. The score indicates that tones other than the *mezzo forte* bass drone should be very soft, “hovering near some threshold between being heard as individual tones at all, on the one hand, and being heard simply as intensifications of some harmonic in the spectrum of the bass’s low F.” The evolving result is an austere and unearthly textural web—a meditation on the

unstable relationship between pitch and timbral perception as the sounds of the various instruments alternately fuse and segregate.

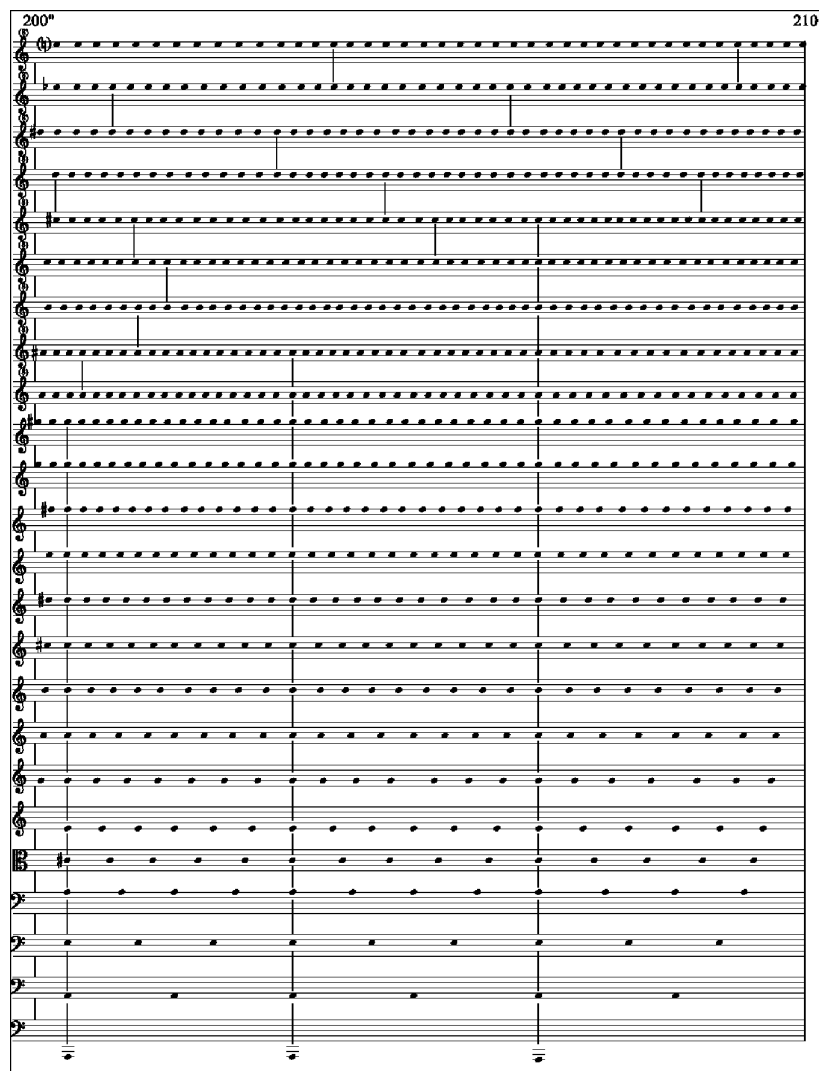
*Spectral CANON for CONLON Nancarrow (1974)*

The *Spectral CANON for CONLON Nancarrow*, completed in 1974, is a work of singular musical impact and highly sophisticated construction.<sup>118</sup> Written for a player piano retuned to sound the first 24 harmonics of A<sub>1</sub>, it is a canon in 24 voices. Each voice implacably reiterates just a single pitch from the given harmonic set while executing a smooth *accelerando*. The sequence of time durations between successive attacks is identical in each voice, but successively higher-pitched voices enter at successively later times. The sequence of durations between the first attack in a given voice and successively later attacks in that voice is a logarithmic sequence, just as the harmonic series is a logarithmic sequence in units of tempered pitch. Thus, an ingenious isomorphism exists between the pitch and rhythmic structures of the piece. In fact, a more detailed analysis than is practical here reveals that the entrance times of the various voices are carefully specified, so that the temporal pattern of attack-time coincidences between any given set of voices is identical to the pattern of pitch coincidences between harmonic partials within the set of tones concurrently attacked.

As successively higher voices enter, they combine in increasingly complex polyrhythms, eventually resulting in a chaotic maelstrom of sound. At the instant when the highest voice enters, the lowest voice begins to retrograde, decelerating. Successively higher voices also begin retrogrades, but at successively later times. Slowly an unexpected transformation unfolds in the form of harmonic glissandi sweeping progressively higher in pitch, and the instrument begins to ring as though sounding a single shimmering harmonic complex (see **Example 2**). Just as the lowest voice finishes its retrograde—at which time it turns out that the highest voice is just about to begin its retrograde—all 24 voices attack simultaneously for the first time in the piece, which concludes with this coincidence. Due to the precise harmonic relations obtaining between the coincident pitches, this final attack does not sound like multiple voices. Instead, it sounds like a single fused harmonic tone originating from a sort of “hyper-piano,” which has been pro-

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<sup>118</sup> The following recordings featuring Tenney’s *Spectral CANON* are available: *Cold Blue*, Cold Blue Music CB0008, compact disc; *Donaueschingen Musiktage*, 1994, col legno WWE 3CD 31882, compact disc; *Musicworks 27* Cassette. A score is available in Tenney 1976 and *Musicworks 27* magazine.



**Example 2. The Penultimate Page of the Score to *Spectral CANON for CONLON Nancarrow* (Redrawn).** Vertical lines indicate precise attack-time coincidences. Note the increasing pitch compass of both the coincidences between lower voices and the harmonic glissandi that flank them. (Copyright 1974 by Sonic Art Editions. Used by permission of Smith Publications, 2617 Gwynndale Ave., Baltimore, Maryland 21207.)

duced by means of additive instrumental synthesis from 24 constituent piano tones. It is as though the components of this final tone, heard in separation at the opening of the piece, are forcefully smashed back together into a unified percept at its conclusion.

One might suppose that correspondences between pitch and temporal structures would be conceptually attractive to composers of spectral music seeking means of organizing rhythm. Tenney appears to have been unique, however, in exploring this compositional avenue. Precedents for rhythmic analogues of harmonic series relationships can be found in the works and writings of Henry Cowell (Cowell 1996 [1930]) and Conlon Nancarrow (Gann 1995), but these composers did not attempt detailed structural integration of pitch and rhythm. After composing the *Spectral CANON*, Tenney went on realizing such integration in other ways, using live performers in the *Three Harmonic Studies* for orchestra (1974), *Septet* for six guitars and bass (1981), and *Song 'n' Dance for Harry Partch* for Partch-instruments, strings, and percussion (1999).

### Other Early Spectralist Works

Tenney produced several other significant spectralist works around this time. Among these is the *Chorales for Orchestra* of 1974, which presents eight lyrical melodic lines in rhythmic unison moving in parallel motion over the “just-octatonic” set used in *Clang*. Each line begins on a different pitch class of the set so that at any given instant all eight possible pitch classes are sounding, with changes in the initial voicing and the instrumentation taking place between sections of the work. Two striking impressions coexist upon hearing this unique piece: that of lyrical melody and that of a single modulating spectrum.

Two important but unpublished works also date from 1974. The *Orchestral Study* bears some formal resemblance to *Clang*, but employs spectrally colored noise textures in addition to tones in order to effect gradual transitions between noise and pitch. The *Three Harmonic Studies* for small orchestra explore, among other concerns, filtering-like operations on orchestrations of the harmonic series and analogies between pitch and durational structures.

Beginning shortly after this, Tenney began to explore the use of tape delay systems in combination with live instruments in order to produce dense spectra with smaller instrumental forces. His first work in this vein was *Symphony* for woodwind quintet and tape-delay system (1975), but the composer describes this work as currently “withdrawn” due to dissatisfaction

with its notation. Tenney's most sophisticated work in this vein is the elaborate three-voice canon for ensemble and multiple tape-delay systems entitled *Voice(s)*, dating from 1983. However, the simpler 1978 composition *Saxony* for one or more saxophonists and tape-delay system exemplifies the technical concept underlying these pieces well, and has been repeatedly recorded.<sup>119</sup>

The score of *Saxony*<sup>120</sup> fits elegantly on a single page. It allows for realizations by multiple saxophonists, but it has almost always been performed by a single performer switching between baritone, tenor, alto, and soprano saxophones. An available pitch process is again employed drawing upon pitches in a harmonic series, specified in the score using conventional notation with deviations in cents from equal temperament indicated above the notes. The score indicates that it "is intended as the basis for an improvisation which—though quite free in many respects (rhythmically, melodically, expressively, and even stylistically)—is totally controlled **harmonically**." The notes indicate that the tape-delay's delay-time-interval should be about 12 seconds and that its fade-out time should be long—it is on the order of a minute in the recorded versions. Thus, the tape system repeatedly reintroduces pitches previously played.

The piece is divided into nine "segments"; with successive segments increasing in nominal length from two minutes to three minutes and then decreasing symmetrically back to two minutes. The total resulting duration is 22 minutes, but Tenney indicated that in performance these timings should be regarded as flexible. **Table 1** shows the complete progression of available pitch sets over the course of the piece, along with their conceptual fundamentals and nominal starting times. The first four segments of the score are shown in **Example 3**.

The available pitch set ascends the harmonic series above  $E\flat_2$  in stages, ascending to the fourth octave above the fundamental over the course of 9'30". Lower pitches become unavailable as higher ones become available so that the texture, which initially is a steady drone on  $E\flat_2$ , becomes increasingly dissonant as the pitch intervals between sounding tones decrease in size. This is accompanied by an increase in dynamic and rate of

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<sup>119</sup>Recorded on Ulrich Krieger, *Walls of Sound*, O.O. Discs 32, compact disc; also on Henrik Frisk, *Inventions of Solitude*, Hornblower, HR 96101, compact disc; also on David Mott, CRI, SD 528, vinyl record.

<sup>120</sup> The title, literally regarded, refers to a cloth or tapestry woven from a fine variety of wool.



**Table 1. The Sequence of Available Pitch Sets in *Saxony*.**

Segment	Nominal Starting Time	Conceptual Fundamental	Available Pitches (Harmonics of Conceptual Fundamental)
1	00'00"	E $\flat_2$	1
2	02'00"	E $\flat_2$	2-3
3	04'15"	E $\flat_2$	4-7
4	06'45"	E $\flat_2$	8-15
5	09'30"	E $\flat_1$	16-32
6	12'30"	E $\flat_1$	8-15
7	15'15"	E $\flat_1$	4-7
8	17'45"	E $\flat_1$	2-3
9	20'00"	E $\flat_1$	
End	22'00"	E $_1$	

Beginning very slowly ..... (accel.)

B-flat Soprano

E-flat Alto

B-flat Tenor

E-flat Baritone

Sounding Pitches

0' 2' 4'15" 6'45" 9'30"

**Example 3. The First Four Segments of the Score to *Saxony*.** Non-zero deviations from equal temperament are indicated in cents above the notes. (Copyright 1978 by Sonic Art Editions. Used by permission of Smith Publications, 2617 Gwynndale Ave., Baltimore, Maryland 21207.)

pitch selection. The score stipulates that “as progressively higher pitches are introduced, there should be a gradual increase not only in the average dynamic level and tempo ... but of melodic activity and improvisatory freedom as well, reaching a peak in Segment 5, where virtually ‘anything goes’ (although an ideal realization would maintain the same precision of intonation here as elsewhere ...).”

In the middle segments of the piece the pitch intervals between sounding tones are very small intervals located high in the harmonic series, resulting in vivid difference tones (Moore 1997) becoming audible in the now-unoccupied low register. Since frequency differences between pitches in a harmonic series are integer multiples of the fundamental frequency of the series, the pitch of each difference tone will itself correspond to that of some harmonic (physically sounding or not) in this series, provided that the intonation of the instrumentalist is accurate.

In Segment 5, the available pitch range does not change. Instead, the conceptual fundamental of the collection drops to  $E\flat_1$ , a pitch that is never physically sounded but which is potentially heard as a difference tone and residue pitch (Moore 1997). The precipitous drop in the low-frequency bound of the sounding difference tones and the attendant increase in their density at 9’30” as the conceptual fundamental plummets are audibly very striking—even alarming. The available pitch set then begins to descend the harmonic series of  $E\flat_1$  over the course of 12’30”, beginning from the fifth octave above this fundamental and concluding one octave above it. The texture returns to its earlier simplicity and calmness as the piece draws to a close, although one discovers that the ear’s awareness of the constituent harmonic partials of each tone has been greatly heightened, having heard their frequencies repeatedly articulated throughout the preceding music.

## FROM SPECTRALISM TO HARMONIC PERCEPTION

Also dating from this period of Tenney’s work is the ongoing sequence of *Harmonium* pieces. The simplest expression of the concept underlying the series is to be found in *Harmonium #1*, which employs a gradual systematic modulation, one tone at a time, between subsets of harmonic series based on different fundamentals. A central feature of this piece is the strong perceptual fusion and relative sensory consonance of the texture which results whenever the lowest tone constitutes the conceptual fundamental of the collection—a phenomenon that Tenney describes as “the sudden making of sense” of harmonic relationships between tones.

Two crucial developments in Tenney's work have sprung from the seed of this early sensitivity to harmonic relationships. The first is conceptual, taking the form of a published semantic history of the concepts of consonance and dissonance (Tenney 1988) as well as a sophisticated theory of harmonic perception, only a small portion of which has so far seen publication (Tenney 1993 [1983]; 1987-88 [1983]). The second development is a body of compositions exploring the perception of harmonic relationships between tones, including *Bridge* (1984) for two pianos/eight hands, in a microtonal tuning system, *Koan* (1984) for string quartet, *Water on the Mountain...Fire in Heaven* (1985) for six electric guitars, and the monumental *Changes: 64 Studies for 6 Harps* from 1985. While these pieces represent an outgrowth of Tenney's spectralist work and betray concerns that are in many ways continuous with it, they represent a complex conceptual development that cannot be addressed in detail here.<sup>121</sup> They should be recognized, however, as a compositional path away from classic early spectralist processes, which retains their radical and characteristic attention to phenomenology and perception without being deflected by such competing objectives as the desire for a quasi-narrative formal elaboration.

#### VOICE-MODELING PIECES

One major subcategory of spectral music comprises works involving so-called "instrumental synthesis," in which an orchestration is made of the spectrum or spectrogram of some instrument or other sound source (Fineberg 2000). Tenney has been active in this area as well, in his own unique fashion. *Three Indigenous Songs* (1979), for two piccolos, alto flute, bassoon or tuba, and two percussionists, was Tenney's first of three attempts (so far) at instrumental synthesis of the human voice. The vocal sources modeled by the music are Tenney's transcription of a song by the early blues singer Jaybird Coleman, a transcription of Tenney's own voice reading Walt Whitman's poem *Kosmos*, and finally an earlier Tenney setting of an Iroquois chant as translated by Jerome Rothenberg. The bassoon or tuba plays the fundamental of each vowel sound, and the flute and piccolos play the harmonics of this fundamental that are nearest to the centers of the first three vocal formants associated with this vowel. The formant frequencies are taken from tables published in the acoustical literature. Consonants are articulated by the percussionists using woodblocks (for 'k', 't', and 'p'),

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<sup>121</sup> Interested readers can find detailed analytic information on these compositions in Tenney 1987 and Belet 1990.

tom-toms with sticks (for 'g', 'd', and 'b'), tom-toms with brushes (for 'th', 'f', and 'h'), and suspended cymbals (for 's' and 'sh').

The preface to the score contains the following passage:

The perceptual space induced by *Three Indigenous Songs* is meant to be somewhere near the threshold between music and speech.

Occasionally, perhaps, some semblance of the underlying texts may actually be heard. (Tenney 1979)

The prospects for actually evoking intelligible utterances by means of instrumental synthesis will not seem entirely implausible to those who have heard examples of so-called "sine-wave speech," in which intelligible speech is produced using only a few sine waves whose frequencies track those of the lowest-frequency formant peaks of the utterance to be evoked (Remez et al. 1981).

Tenney has refined his approach to instrumental synthesis of the voice in two subsequent compositions: *Ain't I a Woman?* (1992), based on a text by Sojourner Truth, and the first part of *Song 'n' Dance for Harry Partch* (1999), based on the composer's own voice reading from Partch's writings. True speech intelligibility remains elusive, perhaps in part because these technically difficult later pieces have yet to be performed at tempo, but the listener can certainly sustain the impression that he or she is hearing something like a slowed-down recording of speech, especially in the most recent work.

## LATER WORKS

Tenney's output of the last three decades has been remarkably varied, embracing works for percussion, pieces predicated on his theories of formal perception (Tenney 1988 [1964]; 1980), works inspired by the dissonant counterpoint of Carl Ruggles, Ruth Crawford, and Charles Seeger, and even eloquent forays into ragtime music. The largest single category of his *oeuvre*, however, is spectralist, and his production in this area continues unabated to the present day.

Important individual spectralist works include the compendious suite *Glissade* for viola, cello, contrabass, and tape-delay system (1982), *Critical Band*<sup>122</sup> for any 10 or more sustaining instruments (1988), and *Diapason* for orchestra (1996), which extends the *scordatura* system that first appeared in *Quintext* more than 20 years earlier. Some works appear in sequences, such as that of *Harmonium #1-#7* (1976–2000), or *Form 1–5* (all from 1993), or

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<sup>122</sup> An analysis of *Critical Band* may be found in Gilmore 1995.

*Spectrum 1-8* (1995–2001). Pieces in the *Spectrum* series exhibit some particularly intriguing conceptual developments that combine elements of Tenney's previous work in algorithmic composition, formal perception, harmonic perception, and spectrum-based composition. For instance, *Spectrum 6* (2001) for flute, clarinet, percussion, piano, violin, and cello divides the ensemble into two instrumental groups that each present algorithmically derived pitch figurations. These groups are distinguished by independently evolving dynamic and temporal-event densities, but draw their pitch materials from a common harmonic series, resulting in a contrapuntal variety of spectral music.

## THE INDIGENOUS NORTH AMERICAN SPECTRALIST TRADITION

Tenney's work can be regarded as one significant focal point within the broader network of an indigenous North American spectralist tradition, a tradition that has to date been largely unacknowledged within the discourse surrounding spectral music. This tradition, like its European counterpart, has aesthetic roots in the mid-century collision between musical and scientific cultures, but also in a more specifically North American musical phenomenism rooted in the music and thought of John Cage, and channeled, among other ways, through late-1960s American process music. Tenney was perhaps the earliest clear-cut representative of a spectralist musical current in North America, although over the past four decades a number of other composers, mostly based in or near New York City, have produced works relatable in varying degrees to spectralism. They include La Monte Young (born 1935), Maryanne Amacher (b. 1943), Phill Niblock (b. 1944), and Glenn Branca (b. 1948) (Gann 1997).

A number of Tenney's students have also composed substantial bodies of work in a spectralist vein. Among their ranks are significant composers such as Larry Polansky (b. 1954) and John Luther Adams (b. 1953). Polansky's contrabass quartet of 1975–77, entitled *Movement for Lou Harrison*, uses natural harmonics on just-tuned strings to achieve an evolving variety of pitch constellations within a given harmonic series, a technique that the composer indicates was first suggested to him by Tenney's *Quintext V: Spectra for Harry Partch* (Polansky 1994). Later Polansky compositions such as *Psaltery* (1979) for tape, and *Horn* (1989) for horn and tape, employ gradual systematic modulations between different harmonic spectra.

John Luther Adams's large-scale musical theatre work *Earth and the Great Weather* (1990-93) includes a collection of pieces for strings and

digital delay.<sup>123</sup> Several of these employ textures, techniques, and tuning systems related to those found in such Tenney compositions as *Quintext V* and *Glissade*. Indeed, Adams describes them as “an homage to Tenney” (Adams 1994). *Earth and the Great Weather* departs from strict phenomenological concerns in its attention to the evocation of place. Here spectralist techniques function in part to suggest the austerity and rarefied temporal sense associated with the Alaskan wilderness where the composer resides.

From 1976 to 2000 Tenney lived and taught in Toronto, Canada, where his influence has been felt by a number of young Canadian composers such as Paul Swoger-Ruston (b. 1968), Josh Thorpe (b. 1975), and the author (b. 1967).

The influence of Tenney’s music and thought deserves broader recognition than it has generally received, especially within the discourse surrounding spectralism. Analytical studies of his work in preparation by the author and others will hopefully begin to fill the scholarly lacuna, but the dearth of good performances and recordings of his spectral music remains vexing. Many of his most important and striking works, including *Clang*, *Quintext*, *Glissade*, and *Changes*, await an opportunity to become more widely known.

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<sup>123</sup> Score excerpts and further information regarding Adams’s work can be found in Feisst 2001.

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## SPECTRAL FLUTE TECHNIQUES WORKSHOP

Helen Bledsoe

**Audience:** Were any of the pieces you played written for you, and are there any original techniques that you played?<sup>124</sup>

**Helen Bledsoe:** The only piece that was written for me on this program was the one by Michael Ellison [*Invocation-Meditation-Allegro* (1996)]. It used basically standard [extended] techniques. Original techniques: I am still looking for them and I can use them in improvisation when I find them.

**A:** I apologize, I don't remember what piece it was in—for the lack of a better description it was almost the growl of a tiger.

**HB:** Yes, that was from a piece by Salvatore Sciarrino [*Fra i testi dedicati alle nubi* (1989)]; it is one of the techniques that is used inside the flute. He notates the fingered pitch and then he writes above the note this little “R.” So what you are doing is using a kind of a guttural flutter [plays example] inside the flute.

**A:** You really got it to come out!

**HB:** Sciarrino uses a lot of “inside the flute” techniques, articulations like: [example] inhaling and exhaling, and the whistles as well. There are several kinds of whistle tones. Maybe that's a thing to talk about. Standard whistle tones on the flute [example] are basically produced in playing position. Salvatore Sciarrino uses a whistling technique that covers the embouchure hole [example] and creates a more ethereal kind of whistle. I can show you that [...] example as well. There is another technique that Heinz Holliger uses: an inhaling whistle, which is basically the same thing, it is whistling while inhaling, covering the mouthpiece.

**A:** How is it you are inhaling, not exhaling; how are those tones produced?

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<sup>124</sup> [The day before this workshop, Ms. Bledsoe performed the following works in a solo recital: Kaija Saariaho–*Noa Noa*; Michael Ellison–*Invocation-Meditation-Allegro*; Xavier Dayer–*To the Sea (homage à Cy Twombly)*; Salvatore Sciarrino–*Fra i testi dedicati alle nubi*; Michael Smetanin–*Nontiscordardime I, II*; and Brian Ferneyhough–*Carceri d'invenzione IIb*.]

**HB:** They are produced by the [...] little bit of resonance going on between the palette and tongue and very slightly hitting the edge of this [example]. The air has nowhere to go, of course, because you are covering the lip plate, but nevertheless ...

**A:** It is a combination of the sound in your mouth as well as the resonance of the flute...

**HB:** You are not really doing [example], but [example]; it is just a whistle tone but with the embouchure hole covered. One of the practical difficulties of this piece is that Sciarrino uses a lot of the covered embouchure techniques in very, very fast combinations with the normal playing position and I would please advise all composers to avoid this; it is very tricky to do. Going from [example] this sort of thing. It is quite tricky, it needs a lot of practice time.

**A:** What did you mean exactly by using “inside the flute”?

**HB:** Inside the flute means that instead of normal playing position [example] where your air is going across the flute, that you cover [example] [with] the lips [example] and play like a trumpet, almost [example]. I am just blowing, that’s what I mean. Any kind of technique like this: [example] tongue rams, [example] whistles, [example] articulations, or [example] the growls or whatever you call them, these are all inside the flute.

**A:** So what difference does it make in the sound, the normal thing and the inside ... what is the biggest difference?

**HB:** The biggest difference is that you have a basic pitch difference. Whenever you cover the embouchure hole, the pitch is a major seventh below. I am going to play an F now [example—difference between pitch in normally played F and tongue ram with fingered F] that’s the basic difference. The other difference is basically acoustical, like the difference I explained about the whistle tones [examples], air sounds [example], and articulations [example].

**A:** These whispering sounds with closed embouchure, are they pitched or just regular?

**HB:** They are pitched. In this particular piece they are fingered: Sciarrino notates the fundamental, usually a note in the first octave. He restricts himself mostly to C, to D, to C<sup>♯</sup>, D and then he writes the overtone swirls. Let me show you that; the score is being passed around now.

**A:** These overtones, you can manage to just pick a point?

**HB:** Ideally. He notates it that way but it is very, very difficult to do. Also on the recording that he did with Mario Carolli it is not always the exact pitch. I don’t understand a little bit because, you know I mentioned about the pitch difference when you cover [the embouchure hole of] the flute—

Sciarrino doesn't recognize that [in the case of these particular whistle tones]. He says that you should do the exact pitch that you get covering [the embouchure hole] as in normal position, and it is not true. So I don't take his exact pitch literally, because I can't produce those very high pitches with the fingering that he writes. So I just do what I can, I stay on a relative pitch. I have never been able to talk to him about this. He doesn't show up to his concerts.

**A:** According to Alter Ego, he was not very helpful anyway. He would talk about the aesthetic of the music.

**HB:** So I would advise against trying to pick out an exact pitch in the harmonic series [using this type of whistle tone]; it is a very difficult thing to do.

**A:** I have a couple more notational questions. Do you find it better for composers to provide fingerings, or for yourself to put fingerings in for the intervals that he or she provides?

**HB:** I'd like to have them written. I might change it if something doesn't particularly work on my flute. I know many of the standard ones but there are some that I don't know, and it saves me time if they are already provided.

**A:** My question is not that technical in essence, my concern is about [transversality?]. Most of the contemporary composers are dealing with other cultures' musics and techniques for bringing new materials into the well-known things—that is a flute in your case, and in your biography one of the most interesting things for me was the Karnatic flute studies, which I admire, by the way. As a performer, do you care about a certain transversality using the techniques of the Karnatic flute in your, let's say, C flute, or do you take the cultural behavior and so on, everything apart from the things you have to deal with?

**HB:** No, it becomes a part of me, there is no way I can separate it, exactly, my studies in India and the things that I learned on Indian flute. It helps my improvisation a lot. I cannot say it really helps if I try to learn a piece by Ferneyhough, but in a way, it does give me a perspective. It does add another layer of interest, and it is very interesting for me, particularly to study Indian music to see how micro intervals are conceived. That was a big opening, which was a big thing for me, because the whole idea of things being based on just intonation adds a very, very expressive use of microtonality that doesn't even sound microtonal at all.

**A:** Do you use circular breathing?

**HB:** Yes, I learned that many years ago, it's a very useful technique to know for flute. It is better to use—I can say this in general for composers—

it is difficult to do on smooth passages or with vibrato or expressive passages, but very easy to do in trill passages. I can play you an example [example]. I can do that for a long, long time, but if you are playing a particular note [example] you can hear a little bit the changes; I can work and practice that until it is a little bit smoother, but it will never be completely smooth—just a caution.

**A:** Are the fingerings from [Istvan] Matuz currently used?

**HB:** I don't know what type of techniques he uses.

**A:** Just fingerings; he developed a kind of fingering for the notation of most multiphonics.

**HB:** Yes, I have seen that. It is very interesting because he did a very scientific and acoustical study about the fingering system of the flute. I don't have it and I am not so familiar with it, but I think it is a good resource for composers to know about this. Istvan Matuz is a Hungarian flutist and teaches in Budapest and is also a composer himself.

**A:** He was here several years ago and played a concert—lots of multiphonics!

**A:** What was the point for setting the first piece with electronics as the first piece of the concert?

**HB:** That was purely practical, because that way we could be set up and ready to go. That was a very time-oriented sort of thing; that way, if things don't work at the beginning you can just start, there is no big interruption.

**A:** Did I see correctly or was I imagining that you had a foot-pedal?

**HB:** Yes, in the first piece, the foot-pedal triggered the MIDI events that were programmed into the MAX patch, and there were 63 different events. Can you pass the score of that around too? Some of you have been wondering about that, or asking. Highlighted in yellow are the events which I triggered by the foot pedal. It is either an effect or a prerecorded sound file that is triggered.

**A:** And they are sequential?

**HB:** Yes, it has a counter and the computer knows [which number it is on].

**A:** What is your point [of view] about using early-music instruments in contemporary music?

**HB:** I think that sonically, coloristically, it is a very interesting area, but I think you have to be careful using these when you have expectations. In other words, these instruments have very particular acoustical properties. If the composer is clever and works within them, I think it can be very effective, but if you try to go outside that, it can be very difficult and very tricky. I will give you an example: I have a transverse flute that has one key and six small holes, these holes are very small; it is actually quite difficult to

play micro-intervals on them, because the holes are so small. So when a composer thinks about it as an Indian flute, which has very large holes for lots of glissandi, that sort of microtonal glissando effect is very easy to do which is not so easy to do on the transverse flute, although people are naturally very attracted to the idea. But you just have to be careful with that, it is very important to work with the performer in that case, to really see what works acoustically on these instruments. But I think the colors and the possibilities are fabulous especially when you use amplification, a lot of interesting things can come out.

**A:** Are glissandi possible on the alto flute?

**HB:** Of course, it is possible. I have an open-holed alto flute so it has basically the same possibilities of a C flute, and my bass flute has two open holes and a couple of extra keys. For closed-holed instruments there are several resources for multiphonics—shaded fingerings that don't use open holes—and you should stick to these resources. This a general thing: glissandi in the lower range of any flute, whether it is a bass flute or a C flute, the range of the glissando is going to be less the lower you go, because you have a very long tube. So glissando [example], this is fingering an E where the tube stops here, goes all the way to here, it is not as good or as broad as something on a C# where I have no keys down [example]. Just a general rule.

**A:** Fingered glissando is possible?

**HB:** Yes, [chromatic] or microtonal [example], it is not as effective, of course, as open holes, but there are ways to get around it.

**A:** I have a question about vibrato. I heard some recordings where the score says no vibrato, but yet there is vibrato; is it difficult for most flute players to play without any vibrato?

**HB:** Apparently, ... yeah! I have come across that myself, and I noticed it myself. Sometimes when you see no vibrato, you automatically do it and then it is too late. But basically it is not hard to do, I mean any flutist who is interested in playing contemporary music needs to have his entire range of non-vibrato playing, as well as not only traditional classical vibrato, but all kinds of strange vibratos, very fast and very slow.

**A:** So if it is a classically trained flutist, we couldn't really expect them to play without any vibrato?

**HB:** Yeah ... as a general rule, yes, be careful. But I think this is becoming less and less the case. I think now that with training, people are more aware. Especially since a lot of people are into early music these days, the traditional teaching of even Bach on the C flute is to use less vibrato and more coloristic shadings with fingering

**A:** Did you have a look in the work of Robert Dick maybe?

**HB:** Yes, I worked with Robert Dick; I have known him since I was eighteen.

**A:** What is your point [of view] about his *Other Flute*?

**HB:** Do you mean the techniques or the actual book?

**A:** The book especially, by the way, techniques which are dealt with in the book.

**HB:** Well I think ... the book at the time that he wrote it was ... it is very concrete. I think it is not as thorough as other books, like the book by Thomas Howell, which has a more exhaustive view of multiphonics. Robert Dick's approach to the techniques, I think, is very good; as far as I know he is the only one who has a very methodological approach as to how to produce these techniques. A lot of flutists, of course, play these techniques, and even my teacher, Harry Starreveld, in Amsterdam, was very good at them; but very few I know, as I say, have a particular approach of how to do them, and have developed a pedagogical basis for practicing them, [so] I am very grateful that Dick has done this. Technically I think that he probably, as far as chops go—playing and technique—he is the best, he has done the best, there's nobody who can touch him. Musically, of course, I think that players like Harry Starreveld (since Harry plays all styles) have a very interesting interpretive approach that I don't get from Robert, but it is just a different approach. But I definitely appreciate Robert's very methodological and technical teachings.

**A:** Since this book has come out, a lot of notational books have come along. I don't know how close we are to standardization. Are there any present texts or sources that [...], to cut down on everybody rewriting the rules?

**HB:** No, it is a big problem and as you said there are books still being written. Carin Levine has just written one, and I haven't seen that yet. [This book has proved to be an excellent notational source for composers. HB] It is a big problem. There was an article about this in *Perspectives of New Music* a couple of years ago, by Sophie Cherier, who is the flutist of the Ensemble Intercontemporain. I understand her frustration entirely, because there is no standardization. Therefore, the best thing to do is to pick one of the texts: the Artaud text, or the Bartolozzi fingering system, or Robert Dick's; just pick one and stick with it and make your explanations very clear at the beginning of the piece. That is also a good reason to write in the fingerings.

**A:** Most of the so-called contemporary performances are tending, in my opinion, towards having as much as possible notes on paper for performing,

than as less as possible, what is your point [of view] between these two approaches or indications, particularly?

**HB:** Sometimes indications are helpful, and sometimes they are not. It is hard to answer that in a general way. If the style and voice of the composer is very clear, then the indications are not, perhaps, so necessary. But if it is not clear then sometimes you are really wondering what is the case. Are you speaking about indications written out, things, or ...?

**A:** My question was totally general—so what is your point [of view] about a certain kind of indeterminacy compared with predetermined material, so most of the performances we are dealing with are seeking for, as much as possible, indications instead of breath, pages with long breaths, breaths, grace notes, let's say, with some philosophical or some sub-text ...

**HB:** I have to say that I don't have such an opinion about this, because I have had the experience of both, and the aesthetic of the composer is what it is, and if it is the aesthetic to have few notes and just philosophical ideas underneath it that's the way it is. You have to understand the voice of the composer, and if that's what he or she has written, you do it. I will put it this way—the fewer indications you have, then of course you have to be prepared to accept the interpretation of whoever is going to play your piece. If that is part of the composer's aesthetic, I am happy for that, because of my role as an interpreter, I am happy to have a freedom of this interpretation. You have the opposite danger if you are a composer who over-notates or over-indicates. It is too much, and the interpreter in that case tries to do everything and may not be able to do everything. So in my case as a performer it is very practical, I try not to have an opinion on it, I just try to do it, and the composer has to accept the results of whatever is written or not written. If you look even at Webern, he didn't of course write so many written indications, but every note will have its own line and then a dot and its own dynamics; every little thing is so composed and somehow it is all very effective, but that means it is very, very tricky. It creates its own tension, concentration.

**A:** You have one flutist [in attendance] here so I am wondering if you could describe how you entered this world, in the beginning, the process you went through to learn extended techniques?

**HB:** I was fortunate in high school, actually, that I had a teacher who knew a couple of multiphonic fingerings and he taught them to me, and then when I was eighteen I met Robert Dick, and I worked with him for a couple of lessons and that is the way it basically came. I was inspired by watching other people. The trick was, of course, learning these techniques, sitting in the practice room, and then getting to the point where I could actually play

them on the stage in front of people, which was another step. And then I think the step that I am still struggling with today is how to incorporate them, and actually turn them into music, to where they actually make sense and become part of my voice and not just this thing, a trick, that I can do. Is that helpful?

**A:** Do you think it is possible to learn this without a teacher?

**HB:** Yes, it is tricky, but as a matter of fact a lot of people who do this thing, do do it on their own. I mean they probably hear someone and watch them do it and maybe ask a couple of questions, take a lesson or two, but then they go off and do it on their own, because people who are interested in this sort of thing are in a way interested in doing their own thing anyway, interested in exploring themselves. So I think it is [possible], yeah.

**A:** I find it interesting what you said about trying to incorporate it into regular musical discourse; what are your thoughts about—for example Robert Dick's book is called *The Other Flute*, is there some kind of normalness and otherness that is being dealt with in your mind?

**HB:** Not in my mind, but I think when I have got a good bit away from the traditional, orchestral flute-playing world, and I am sometimes shocked by it, when I come back to it or when I speak with my other flutists. So perhaps there is, although in a way I am refusing to recognize it. So there!

**A:** Do you think that using these techniques more and more makes the performer put more effort, or does it make each performance special because everybody does it in a different way? So do you think that brings what the performer could say in the piece more and more?

**HB:** Yes, I think so, and I think that is part of the thing that is wonderful about this. In a way, there is no standardization per se yet, really, and because [one's] techniques are very personal and based a lot on the acoustics of everyone's individual flute, you always get funny acoustical things if you write the same multiphonic. It may not sound the same for every player. I think this is a great thing, it is a fantastic coloring thing, but it is also ... If you take a piece by Ferneyhough for example, because this piece is so complex and is written in such a way that many things are not possible, what you will have is every performer finding his or her solution, which makes each performance very individual. This is a wonderful rich thing, and I will be kind of sorry when standardization comes.

**A:** You sort of touched on this earlier, when you were talking about going from a regular position to a closed position. Along that line, are there composers like myself who kind of want it but have been afraid to jump head first because we really still don't understand everything about it? Are there common mistakes that composers—when you get a score, “oh yes,



everybody does this; I wish they could find a way not to do that or would learn not to do that?"

**HB:** Well the one thing is to be very clear, whether you want something in the flute or in normal playing [position]; be very clear about that in your indications at the beginning and during the piece, because that is some kind of a problem. And the other thing is as I said, just expecting too much too quickly, or if you write it just be prepared that [the difficulty] can also be an exciting part of the thing, the whole of the piece. Those are the main things.

**A:** Can I ask what the technique is in the beginning of the Sciarrino piece? There is this strange tone color, in the entire passage.

**HB:** Well, perhaps that was just the ... This is how the opening looks [shows score] just a fast [series] of multiphonics, please excuse the condition of these and please excuse the fact that I am playing from photocopies. I have the originals—just that you see what happens to my music. I carry it all over the world, and if I do that with my originals, they will not survive. This is the series of numbered multiphonics; and all of these are very specific; I should say a general thing also about multiphonics: you have seen in the Sciarrino piece that they are very specifically notated with every note that is possible. Please be aware, though, that when you write multiphonics for the flute they are more coloristic and it is very difficult to produce real polyphonic effects, like on the piano. What you will hear often in the multiphonics are not individual notes but more tone colors [example]. The first tone that is written in the Sciarrino piece is this [example]. So if I would try to isolate—I can isolate a few of the notes of that, but it is very difficult to do this sort of isolation and to produce the real, full polyphonic effect. So my advice to composers is to really think about multiphonics in this acoustical and coloristic way, although there are some beautiful exceptions, which Sciarrino has done. The second set of multiphonics that you see [lettered] are dyads [example]. There are a number of multiphonics like that which do produce a nice polyphony if you play them in succession [example].

**A:** What about the growls in the Sciarrino—how do you do that?

**HB:** Well it is a kind of [example], a kind of flutter tongue that is produced inside the flute [example], and then he notates the pitches [example], and the rhythms.

**A:** Was that again a seventh difference or ...?

**HB:** Yes, I can even tell you what it is [example]. Yes it is the same difference.

**A:** Do you have any apparent difficulty in producing these sounds, is there any work going on about extending the flute mechanically?

**HB:** Yes, I have one. This is a flute designed by a Dutch woman, Eva Kingma. She didn't build this flute but she designed it. She built my bass flute and my alto flute. [The C flute] is a quarter-tone system. On the flute you have normally open holes, like this, but you have certain breaks where there are notes like on the thumb, that don't have an open hole. This key that doesn't have an open hole, this one as well, and this one. What she has designed is a piggy-back system where by means of a lever you can actually "half-hole" the notes that are not covered by a finger. You see what I mean. And she has it on thumb as well. You can actually "half-hole" without having an open hole on the thumb or the G key, since there is no finger that covers this key; but by means of a lever, I can "half-hole" it. That is the main thing that has happened in this century, or the last century, [with regards to] extending the flute. Of course that makes also many other multiphonics possible.

**A:** It will be very difficult and frustrating to do it without those gizmos?

**HB:** Well yes, if there are multiphonics written with these gizmos then you have to use this flute. I use it; for example, I love to play the Ferneyhough with this flute, it is much easier. But it wasn't written for flute; it is very possible to play it on the standard flute, or a closed-hole flute.

**A:** When you just played these multiphonics, you isolated the partials?

**HB:** Yes, it should be possible to play the different partials separately, although be careful, because when you notate them ... For example, I know in Bruno Bartolozzi's book [*New Sounds for Woodwinds* (1967)] he writes some of the standard multiphonics. Here is one; it is C at the bottom and D at the top [example]. He notates this C, G, D, because he did some analysis and the machine picked up G somewhere in here [example]. I can neither hear it nor isolate it. But be careful, if you take this multiphonic from Bartolozzi and tell the flutist, "now, play the G there." It exists only somewhere, so just be careful with that, do that with caution.

**A:** Who would you say is the leading composer in terms of using the voice in combination with the flute?

**HB:** Particularly, at the moment I like Saariaho's use in the piece that I performed yesterday, *Noa Noa*. I can say some things about using the voice and the flute, which are probably useful. I think, again, use the voice with the flute more as a coloristic rather than a polyphonic thing, because you get a lot of distortion, of course, when you add the voice [example]. And when you really try to create a polyphonic effect, unless it is something very simple, you are going to run into a lot of trouble. You often will not hear two distinctive voices because of the distortion that is going on, but if that is the effect you want, that's fine, that's really no problem. Sometimes it is

very interesting, especially when you are working with close intervals [example]; I was adding the harmonics. It can be very rich. That is just a small caution. Another caution is when you are using text with the flute, it is a good idea, not to try to .... Well, I will give you an example of that from a piece that I have here by Hans Zender, [where] he uses a lot of vocal things like [example] that are punctuated and isolated, and you get [example] the resonance of the flute (*Lo-Shu*). He has written one passage in here where he wanted to use a “nhee” and he wanted to get the resonance of the flute using “inh;” I think it sounds so ridiculous. So that’s just a caution, be very careful when you want resonance of the flute and when you don’t want resonance of the flute. Punctuation and vocal effects are very useful, like [example]. Another coloristic use of the voice, which often is very effective from this piece [Zender], for example, is the changing of the vowel sounds when you are playing. This is particularly effective when you are covering the instrument and blowing into it [examples]. With trills it is also a very effective thing. This is an interesting piece, by the way, of Hans Zender, which I recorded a couple of years ago, and the CD has now come out. A very interesting coloristic use of the flute written back in the 1970s.

**A:** On what label is that?

**HB:** CPO [999771], with Westdeutsche Rundfunk, WDR3. CPO is the distributor and the label. I can pass the score around too, if you think it is interesting. Did I cover all the things about the voice before I go to something else?

**A:** I just wanted to ask about the resonance and the flute. Does it matter what fingering you are using?

**HB:** When you are going in the flute?

**A:** No, just the resonance of the flute.

**HB:** Yes, the finger does matter [example], it makes a big difference.

**A:** Only the first octave?

**HB:** [Example.] Yes, the first two octaves, I would say [example]; the first two octaves are the most effective.

**A:** Will you be so kind as to allow my somewhat ironic point in this last question, which is once again dealing with a certain fetishism for extended techniques, dealing with multiphonics and so on? Could you please name some composers, I believe in your taste, who are extending music without making these kind of, well, showpiece kinds of extended techniques, pushing by means of mostly the core of the composition?

**HB:** Let me see if I understand your question; are you saying composers who do not use these techniques?

**A:** Do not **necessarily** use these extended techniques, but I don't say anything to the repertoire you choose, thank you by the way, but we were mostly dealing with the techniques, not the music, unfortunately. Are there any composers, for example Berio, in the *Sequenza*, early or good example for my point, more music than mere show on the person, or more demand on the performer, related with my former question, blank page and music?

**HB:** I can think of some; that is a tricky question. And if you do think of Berio, Berio did not use a lot of techniques; he uses in the *Sequenza* one series of multiphonics based on very simple harmonic series.

**A:** Isn't that very subjective, can you say that using these techniques makes music less, as he's saying—can you say that?

**HB:** I am not sure he says it is making music less, he is saying that ... Other composers who don't use these techniques but nevertheless extend themselves, somehow, extend the music somehow, other than using techniques, perhaps with a philosophical ...

**A:** Maybe, or common grammar of ...<sup>125</sup>

**HB:** ... and I can think of other composers who deal mainly with silence, for example, Petros Ovsepyan, an Armenian composer who lives in Berlin. He deals mostly with silence and how silence is created; he is very specific about this.

**A:** Mr. Burn's [?] do, re, mi kind of music?

**HB:** I don't know this.

**A:** Well, just write the notes: do, re, C, D, E, kind of music. Could you name some composers who might be capable?

**HB:** It sounds to me like something maybe Tom Johnson would write, with his counting music, perhaps, if I understand correctly.

**A:** Do you mean music written by ancients?

**HB:** No.

**A:** The music that you played at the conference, are all these scores readily available or only through the composer?

**HB:** Michael Ellison's piece is a manuscript, the piece by Michael Smetanin is not published but it is available through the Australian Music Centre, and I believe everything else is published.

If there is anything you would like to hear or any other questions? I am sorry there is not much more time left. Do you want me to show things or demonstrate things?

**A:** Could you just show us quickly that [instrument], I think it is a bass flute?

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<sup>125</sup> [At this point, the recording was briefly interrupted.]

**HB:** This bass flute was built by Eva Kingma. It has two open holes, and a couple of extra keys and it was built on the same design as the other (C) flute. Other than that it is a standard bass flute. To me it is interesting, just as a personal subjective thing, to find pieces that are written for bass flute. Most of the composers whom I know writing for bass flute, don't really explore the lower octave so much, they usually focus on [example] blowing, over-blowing, and doing things like that. I find that the lower octave is very often just ignored in the bass flute; it is a real shame.

**A:** Why would you use a bass flute?

**HB:** Well, it has some really great effects. Also, in general most multiphonics don't require open holes, so you can use multiphonics on the bass flute. The articulated things—the things inside [example], are particularly effective because you have such a huge tube. The use of the voice is also sometimes very effective [example].

**A:** I think that the multiphonics are more pronounced because of the larger tube.

**HB:** Sometimes, but they are trickier [example]. Those are some of the dyads I played on the other flute; this is how they sound on the bass flute [example]. Just a little funkier, you know.

**A:** Is it easier to produce a harmonic sweep?

**HB:** It is easier to do on the lower flutes because it comes anyway, whether you intend them or not. This is an interesting thing I wanted to talk about: the harmonic aspects of the flute, since this is a Spectral Conference. I wanted to mention the composer Joël-François Durand, a French composer living in Seattle, who is writing a solo piece for me that I will premiere next year with the musicFabrik. What he has done is very interesting. He has done a spectral analysis of all of my flute tones and come across something very interesting, something that is actually common sense. It is that the lower tones [example] of the flute are very rich in upper harmonics, but if you play in the upper octave [example], what you have there is an interesting “non-harmonic ghosting” of lower harmonics; that is, notes that are underneath the sound [example]. You can isolate them if you play in an improper way [example]. And he has used this sort of phenomenon as a way to structure the piece and the different colors of the non-harmonic passagework of this piece. This sort of cross-harmonic passage of the low tones with the upper partials and then the upper tones with the lower partials as a way of structuring the piece, I am very excited about it.

**A:** And when will that be premiered?

**HB:** That is September 19, 2004.

**A:** Do you keep on playing recorder?

**HB:** No, not really—I don't play recorder very often; I am too busy. I just bought a traverso flute last year, and I am busy sort of relearning that, because I studied it a long time ago. Thank you.

## HYPERION ENSEMBLE WORKSHOP

Iancu Dumitrescu and Ana-Maria Avram

**Ana-Maria Avram:** In this workshop, everything is free, questions are allowed and welcome, and we'll discuss the ideas of acousmatic, cryptic sounds, and metaphor in sound, in spectral music, through performances by the Hyperion Ensemble. The first point of our workshop will be a piece whose name is *Small Remote Quasar*, a piece for viola, computer-assisted sounds, and percussion, one of the newest pieces composed last month by Iancu Dumitrescu. We have a computer-assisted part which is a sound already metaphorised and which is also a spectral music, which plays with harmonic and inharmonic sounds, with an alloy between musical sound and noise. We have Cornelia Petroiu as soloist. We'll hear it, and then we'll speak about it afterwards. It is a cosmic music—cosmic projection, foreboding—on tape combined with a very “human” music for the viola part. It is “cosmic music” by means of sound explosions—like a pulse of a strange and very remote star, with an infinite musical space, so “cosmic” at a poetic level, the expanding-beyond-its-limits of the sonic universe. Can you imagine the sounds of the movement of remote planets and stars? How does it happen that the noise of the cosmic rotation of the earth doesn't disturb us?

**Hyperion Ensemble:** [Performance of *Small Remote Quasar (I)*, by Iancu Dumitrescu. 14 minutes.]

**AMA:** Maybe there are some questions that you would like to speak about?

**Audience #1:** From a purely technical point of view, I'm just wondering what software you're using on the computer.

**AMA:** What software ... it's not only one software, normally this music is made with a transition by many, many programs. There are about 20, because everyone has something good to give you and something less useful for obtaining those kinds of sounds, which are very cryptic. Then there are many programs used simultaneously, because it's not the idea of having an electronic sound or a sound that can be very clearly identified, even in an electronic way. The aim is to obtain something unique, genuine, and original. Otherwise, all the software, used as everybody does, has the same

result that you can hear everywhere, as a folk music. But Iancu Dumitrescu and I are looking for this idea of a cryptic sonic metaphor, where finally you can't identify anything. Though, it's a **fight** against the computer program you are using. Always used at its limits. Using it for what it's unable to do. That's why we sometimes are using very small and obscure programs which apparently are good for nothing, but which you should drain out to the limit.

This is in fact the idea of acousmatic. Acousmatic is a Greek term. At the beginning it was about the sect, a mystical and philosophical sect connected to Pythagoras, a part of the Pythagoreans were named "Acousmatics." In fact, acousmatic means "hidden": when a partially profane person or a neophyte was present, they were not speaking with him directly, but behind a curtain. This means that in fact you are dissimulating the source of a sound, of a message, and in that way, the message is stronger, different, and a little bit cryptic. But cryptic, if you want, at the physical level. For example, you know the *acousmatique* term in French, from which derived also *acousmonium* sometimes, which is an orchestra of loudspeakers used for music, which in fact is music **on a support**. It's tape music or just a music made with means **that you can't see**, because there are a lot of means used in it and they are mixed on a CD, a tape, or anything else. But if you are familiar with those sounds you can recognize them, even though they can't be brought in front of the listener: this is a door cracking, or shouting; this is a cat, steps; those are children's voices; and so on. But acousmatic in Iancu Dumitrescu's point of view is something that even though you can see the source of the sound—as if it is, for example, purely instrumental, with musicians in front of the listeners—it's a true sound metaphor. That is something that can't be explained, and can't be designated as something, this or that. This is why we can't answer your question, what about the software used. Because it's completely irrelevant, I think. They can be very banal software but which are used for the profit of a **cryptic** sound.

Okay, another question?

**Audience #2:** The viola part is obviously to be in a manner of soloistic performance, but why not put the percussion part into the pre-recorded media? The viola part is very soloistic and obvious to put with the very correct medium, but why is the percussion live but not on the pre-recorded tape?

**AMA:** First of all, of course this room is not the best place for the performance, you know, the acoustics; it's the space that is a little bit inappropriate. But the idea of using the remaining echoes of something which already is gone, and which is, if you want, the "story" of the tape, and the percussion is only like some reminiscence of the tape, with these



cymbals played with a bow. The situations are very different. Otherwise, on the tape there are only computer-transformed sounds, which cannot be obtained by live playing. But it isn't the case for the percussion. Seems inelegant and illogical to combine on the tape computer sources with normal instruments that could play live. Even the percussion is obviously not a soloist.

**Iancu Dumitrescu:** It's a different kind of sound. The computer sound is a very abstract one, and the cymbal sound, on the contrary, is natural; then why should we put natural sounds on support, on tape? It's not possible. It's very specific, this kind of sound ... as well as the other one. Evidently it's not so bad, the acoustic, but in fact the space is not very appropriate because, for example, the screen of the computer needs to be in front of the viola—the player needs to see the evolution of the tape—this performance is a compromise, for the concrete conditions. If you invite us to a second festival, we would probably play better!

**AMA:** Is there something else, which we could speak about?

**Audience #3 (Tolga Tüzün):** This is a composer [speaking], actually. Before the creation of the electronic sounds, how do you organize your ideas, and how does the compositional process work for you? I mean, how do you decide what type of texture is going to be in the electronics, what kind of texture is going to be in the live instruments, and how do you combine them sonically? Do you have a preconceived idea, or do you go along with what you create and continue [that way]?

**ID:** I am against the preconceived ideas; I want it each time to be very pure, each time to be inspired by something. In this case, the problem is a complementary dialogue between the sound of the computer and the natural, instrumental sound. It was so because this piece was created and dedicated to this musician, Cornelia Petroiu. I organized the function of this particular relationship between electronic and instrumental sounds, which are here partly complementary, and partly contrasting. It was a concrete, particular problem that I had to solve. But each music has other problems. I can't generalize what they are. It was a music for viola first, and after it was a music for computer and viola, and after I completed it with the percussion instruments (but we haven't here the best cymbals for this music, but those are the concrete conditions and we had to deal with them).

**TT:** We know that many French spectralists use a lot of computer; they call it "computer-assisted composition," in the process of composing. Do you do that also or are you composing on the paper? Do you use computers for composing, as they do, or do you use just paper and realize the ideas later?

**ID:** Yes, I also call my computer music “computer assisted.” But in the same time I have a very personal experience in this kind of music. I am out of time, out of style. I am not conforming to French. I love very much the French music; I love very much the French composers. I played many times in Bucharest and all over the world, if you wish, contemporary French music, particularly the “spectral” music. It’s also for me a very important musical school, in Europe and all over the world. Should I not repeat the same things, once more? Though I respect the French position, I respect the French attitude—it’s a Cartesian attitude, a logical one, and also **quantitative**, if you wish. In the same time, you have in Paris excellent sound laboratories, very good equipment, with many musicians and many engineers, and so on. But in fact, the artistic result of all those efforts, intellectual and material, are not overwhelming, at least in my opinion. I think not only in Bucharest, not only in Romanian music, also perhaps in Istanbul or in other places, many composers discover other manners of using computers. For me, excuse me, I can’t accept this kind of imperialism. I love the French culture; I love the French music. I love Tristan Murail, I played Tristan Murail’s music but I found this music, particularly the very recent one very, very—if you wish—scholastic from the point of view of a real adventure in new music, and from the point of view of spectral music.

**AMA:** It’s also the problem, if the computer is allowed to have an initiative in composition, if it can have tasks regarding the conception of a score or of a music, after some algorithms you just gave it before. It’s not the case of Iancu Dumitrescu, he’s just using the computer as his acoustic tool, just to transform sounds, you could have new sounds, but the computer never has any initiative in his vision. It’s just a tool. It doesn’t **assist** the musical strategies of the composer. It doesn’t intervene in the construction of the music. I think your question was referring to that, whether it is possible to generate music by a program that you allow to a computer. I think that it’s not our case. In a conceptual and philosophical way, we rejected this **mechanical** endeavor.

**ID:** I can add two words. Because it’s a new current, a new style in contemporary music, it’s better, I think, to be free to try to discover in our spirit, to discover in each of us, to discover in our sensibility, to fathom in our own potential to make music. This is important. Not to accept the ideas and to live the ideas of others. Evidently it’s cultural, if you wish, but at the same time, I think that the other side of the globalization era we are living, is the fact that each person can enter—with his own and personal point of view—in a dialogue with others. This is very noble, and that’s why I agree with globalization.

**AMA:** It's also connected to a primordial thing, which is, how do you define music? Music could be something where you can express some ideas, eventually brilliant. But if you conceive and do music in that way, you will generate not music but an expression of those brilliant ideas in a different matter. But if music is an **experience to live**, if music is something that is made *hic et nunc* [here and now], you have to **live** the music. And here is another problem, another specificity, if you want, of Hyperion Ensemble, and another part of the conception of Iancu Dumitrescu, which is related to phenomenology, and which is related to a **living project**.

**ID:** Evidently, for the countries of Eastern Europe, as well as for Asia, the idea of music has a different meaning. Each space, though, has its different necessity, its attitude, its conditions for the dialogue inside music, and for the dialogue between people, because music for me is a dialogue. To contact another, a different culture, that's also a necessity. For Western Europe on the contrary, the primordial necessity in music, in art in general is the construction, the structure. For Eastern Europe, there are other necessities: ritual, magic, another function, though. For the French musician, for Americans, on the contrary, the structure is the most important thing. You are a good composer if you have a very evident structure. For others, for Japanese, for example, the absence of structure isn't a pejorative thing at all. So, we have two poles of the music. The structure is a limit. For me, the structure is a limit of the music, and I wish to be unlimited. Excuse me, it's my point of view, it's my specificity. I wish to be unlimited. And I have different desiderata. I need to assume, for example, the acoustic of the hall, the acoustic of the position of the instruments, and so on, the quality of each other musician in this dialogue of my ensemble, or of an orchestra. For the French, for Pierre Boulez for example, of first importance is to have, for example, a very precise reading, but of a music for paper, not a music for hearing. That's why we are today in this terrible crisis of music because of this rationalist and limited conception "I'll write very complicated rhythms and intonation"—that's all. God preserve us if only complication is the criteria of value!

**AMA:** And the slaves will play them.

**ID:** Yes, and the public will hear something and appreciate the complexity. Nonsense! We are in the biggest crisis of music in all the history of music, in any case of the European history of music, because it's a music not for hearing, but for paper. It was a great confusion. But evidently there were also exceptions to this rule, brilliant composers like Stockhausen, Scelsi, et cetera, who denied this kind of thinking. For us it's another condition of the sound that matters. Each person assumes the errors or the quality of other

musicians. It's a dialogue, not absolute precision, a dialogue between musicians, a dialogue with you; it's a permanent evolution. This kind of music is a transformational one. It's not sound in the classical point of view; not a combination of some notes. It's an evolution, a transformation of each musical phenomenon. A dialogue in transformation. It's not possible to know at first.

**AMA:** Yes, it's a hard problem.

**ID:** It's a great problem, it's very difficult to translate, and each musician translates the signs of this project in—perhaps another sonic quality. That's why it's absolutely necessary that the master, the composer, has to be very implicated in this practice. It's like in Indian music—an experience. Every time is a different but no less important moment for the evolution of an ensemble. This kind of composer is not somebody who writes down and gives you the result “to play please.” It's an experience to live. It's a very determined situation of the music. It's like at the beginning of classical music in Western Europe: not a divorce between the chief, the composer, and the player. The master was the chief of the orchestra; he was the first violinist, or a great pianist, a great organist. Brahms was, if I know, the first who couldn't play his violin concerto, because evidently he was overwhelmed by the texture of the solo violin part. But Bach and Mozart could play almost all the instruments! It was another experience, another kind of living music. After this, Mahler was a conductor—a great one. You can see when you hear the music of Mahler, it's clear that he was a great master of the orchestra, not a handbook of orchestration, but an impressive experience with the instruments and their combination.

**AMA:** Now we'll present you a piece that is also involved in the project. Its name is *Pure Intuitive Spectral Music*. It's a musical practice where the sounds which are diagonal, which means multi-sounds for the wind instruments, with no usual sounds for the strings, with the diagonal technique of producing those sounds, also for this aim of producing a sonorous metaphor. We'll speak more about this afterwards.

**HE:** [Performance of *Pure Intuitive Spectral Music*, by Iancu Dumitrescu. 20 minutes.]

**AMA:** In this condensed score, they have only the place for the multiphonics, but there is another score, which is a pre-score. There, every point of this very rapid and condensed score, the musicians have their own fingering and everything, which is very clear for them, and they just apply this enlarged score to one rapid and condensed score for everybody's coordination. It's like a conductor, it's a conductor's score, but all of the details are pre-established in other parts of the score: reservoirs of effects, of

techniques, of fingering (such as multiphonics for clarinet, bass clarinet, bassoon, and tenor saxophone).

**ID:** In conclusion, it's a very, if you wish, precise score introduced in a very open score.

**Audience #4:** There are two kinds of scores?

**AMA:** Yes, there are two scores, but in fact, there is one score for everybody. For each instrument a different score, and the general score for coordination.

**A#4:** Not all the scores are the same?

**AMA:** No, the general one is the same, the "free" one I mean, but the other, the complementary score is individual, it's for each something different. Different for the strings, different for the clarinet, different for the bassoon, different for the saxophone.

**A#4:** So does it have to be this exact instrumentation, or could there be a realization of this piece with a different ...?

**AMA:** Yes, of course. It's an open score. It's an adventure through something.

**A#4:** Through the spirit.

**AMA:** Yes, through the spirit.

**ID:** Time by time it's like an exercise of our spirit, for not to analyze our hearing, our instrumental technique. It's like a sport moment.

**AMA:** Yes, it's a training, of course. From outside one can think it's a part of improvisation, and in fact it is but isn't, it's a very conducted improvisation. It's not that everybody just plays with nothing in their head, just completely open. There are obliged parts of the language, of the style, which are implied by our knowledge, but also by these complementary scores.

**ID:** Tomorrow, for example, you can see a very composed score, very written score, in the same spirit, if you wish, in the same free spirit, but in the same time a very written score, and very written music, and very structured music if you wish.

For this, we can say that this moment, this score—*Pure Intuitive Spectral Music*—is like an exercise for tomorrow. It's not sure if it's really a new art moment for you because we are in a very difficult moment. Each moment is with other qualities and other weaknesses. But at the same time it was for us a very good moment of the music, of thinking, of improvisation. Other questions?

**Audience #5 (Matthew Goodheart):** How influenced have you been by the works of some of the AACM [Association for the Advancement of Creative

Musicians] composers of Chicago, or Wadada Leo Smith? You do very, very similar things to theirs.

**AMA:** Do you think so?

**MG:** Oh yeah.

**AMA:** We have no connection to them. I'm sorry.

**MG:** Have you listened to any of their music?

**AMA:** No. Maybe they listened to ours.

**ID:** What is the name of these?

**MG:** The Association for the Advancement of Creative Musicians, in Chicago. Composers like George Lewis and Wadada Leo Smith and ...

**ID:** George Lewis is a known name.

**MG:** Yes. Fred Frith has done many similar things too.

**AMA:** Fred Frith is a friend of our friends, but we never worked with him. Not yet, I mean...

**ID:** In Michigan, for example, we have a small CD production, and we meet this week again with Professor Gerard Pape.

**AMA:** From Michigan, it's a teacher of one of our friends who is also in a spectral direction, who is from Paris. Our friend, Gerard Pape, is a director of the CCMIX [Centre de Création Musicale Iannis Xenakis, formerly CEMAMu] studio in Paris, which is in fact a parallel studio more interesting than IRCAM [Institut de Recherche et Coordination Acoustique/Musique] because they do things more up to date and more creative, because it's small and the possibility of evolving is very important. We found the American teacher of this friend of ours, whose name is Pape; the teacher is an Italian from Michigan whose name is George Cacioppo. Cacioppo says something for you?

**MG:** No.

**AMA:** It's a very interesting music, and in a very Italian way, if you want, something which has connections with Berio's music eventually, but Berio of the first period.

**ID:** Or Evangelisti, for example.

**AMA:** Or Franco Evangelisti more, because it also has some spectralist intuitions, and a very important beauty of the sound, a pleasure of using the sounds and the colors, and very good music, which we will produce very soon on a CD in our series.

**MG:** I'm just struck by both this performance and the things I heard this morning, how similar many of your explorations are to many improvising musicians like John Butcher, or many of the bass things are very similar to some of the things that Peter Kowald was doing.

**ID:** No, it was only a coincidence I think. Hyperion Ensemble was in London at the same time as Butcher. It was a concert of Butcher in advance of our gig. In *Resonance* magazine of London, of the London Musicians Collective, is an article, an interview with me after a concert with Hyperion in London, at the LMC Center, and it's only circumstances. I don't know the art of Butcher; excuse me.

**AMA:** We didn't play together.

**MG:** Do you have any reflection on why people exploring different compositional and processional streams might arrive at a similar aesthetic?

**ID:** It's my intuition, I am sure, and I am very happy to know and to imagine that in many points of the world, many people have a similar tendency to discover. Because, in fact, this world of sounds is a very, very small world.

**AMA:** And very necessary, that's why, probably.

**ID:** In Romanian culture there was a very great philosopher and professor of aesthetics, whose name is Nae Ionescu, between the First and Second World Wars. He described this idea: many cultures are in synchronization, in a synchronic moment. For the Romanians it was like a provocation. **Be** synchronized with others, **be** in the front of the idea, and **be** in the very active attitude. I am sure that it is normal, it's probable, it's probabilistic to be many, many other musicians, and for this, I am happy. This is in fact the argument for this objective attitude of ours. If I discover you in me, if you discover you in me, we are in objective relationship. In other situations, it's very dangerous because you can be absolutely genius, or another kind of ...

**Audience #6 (Robert Reigle):** May I say one thing also, I think there is a big difference between these two schools. There's the Butch Morris "conduction," the Masashi HARADA "condanction." First of all, the aesthetic is very different. Just the fact that one technique of conducting an orchestra is the same—the sound, the meaning of the sound, and the aesthetic to me seem quite different. One of the differences is, in a lot of the musicians that are coming out of the jazz tradition, there's a much greater use of figurative gestures, that I think is largely absent from Iancu's music. Do you agree?

**AMA:** Moreover, we constantly try hard to eliminate them. Even though we have some figurative, let's say reminiscences, we try to eliminate them. We don't want them. It's an unhappy moment when they appear. But when you consider things from a necessary distance, very different approaches, very different aesthetical adventures could seem similar for some people.

**RR:** Could you comment about how your aesthetics contrasts with Giacinto Scelsi's ideas?

**ID:** Oh, it's very long.

**RR:** A short summary?

**ID:** Yes, in the USA I have some very "good friends," two or three, who had the pleasure to destroy me, to deny my originality. In what kind of view? Saying they appreciate very strongly the music of Scelsi and that "Iancu is the epigone of Scelsi; do you know Scelsi? Iancu is nothing; Iancu is a small and ridiculous person."

But in the same time, it's absolutely necessary to establish the reality. Scelsi died in 1988. In 1987 took place the first symphonic concert in Köln, with Scelsi's music, and it was the great revelation of this music in the world. Some other small pieces were played in Rome and in Paris, sporadically. Myself in 1986 I think, being in Rome with an international Hyperion Ensemble, with Fernando Grillo and other great players, I met once Scelsi who was among the public. This happened in 1985 or 1986, I am not sure. I was greeted by him. He was a small man, very picturesque, very ...

**AMA:** serene, with a beautiful light on his face.

**ID:** But he was absent, completely aloof. A friend of mine in Rome presented me to Scelsi and he shook my hand but he was in the same time absent. Instantly I was impressed but after some hours, I discovered the reality, the truthful reality. He was absent, he had kind of a transfer, perhaps, and I maybe just imagined that he was enthusiastic about my music; he was so aloof.

To resume, regarding Scelsi's phenomenon and the supposed relationship of my music, I have to say that I knew about Scelsi's music only through records and a few concerts, in the late 1980s. As a matter of fact, remember that he got famous spontaneously a few years before his death. The majority of his scores were published only three or four years later, around 1987-88, by which time I had already pursued the adventures most significant to me. *Movemur* and *Medium II* were conceived between 1972 and 1976; *Cogito/Trompe l'oeil* and *La Grande Ourse* are from 1980 to 1981, a time when very few people knew about Scelsi. I currently feel a strong attraction to his music, but at the same time, the opposite is true. He has a great spirit. His experiences, mostly meta-musical, are close to me but also limited. It is evident that Scelsi's work is a contemplation of sound as an exterior phenomenon, an object, an immutable reality; intervention is therefore an impossibility, as opposed to my interest in the **interiority** of sound.

For me, observation is made under a magnifying glass. Consequently, the inner structure and infinitesimal changes are hyperbolically enlarged, which of course implies a large dose of idealism and whimsical imagination. The contemplation of Scelsi's sound remains **static and opposed to mine**;



for me the sound, the musical thought is essentially transformational, evolutive, occultly dynamic. Consequently, “Scelsi’s shadow” can float inside the imagination of the listener who tends to reduce phenomena (to understand, to be able to place them). But that can’t happen to me, when ten years before Scelsi’s apparition I had already composed and recorded a major part of my music.

In conclusion, Scelsi was very unknown, at the time. My music, my great experience, I made earlier; you can find this in our LPs, later re-released on CDs. The LPs were produced in 1985, 1982, 1983, where I imagined a very, very important spectral music. Some scores were already published by Salabert, et cetera, and were played in several places. I am not influenced by Scelsi’s music and I wasn’t because I simply didn’t know it! This is the reality. It’s a synchronized, perhaps, phenomenon, but there isn’t any of Scelsi’s influence in my music. I did not know in this period Scelsi’s music. But it’s in the same time very important to say that the Romanians were among the first in Europe to appreciate and to promote the music of Scelsi. It’s a case of Horatiu Radulescu, who was very friendly with Scelsi. It’s the case of another great composer, Costin Miereanu, who was in the 1980s the director of Editions Salabert in Paris, and he accepted with great enthusiasm to publish Scelsi’s scores. Scelsi was unknown, unappreciated, and this Romanian composer, Costin Miereanu as director of Editions Salabert proposed to publish Scelsi’s music. But evidently, after that, there were many German musicians, German musicologists, also in England and America—Scelsi was also published in New York, I think. But it’s important for me as a Romanian, that Romanians have a contribution in this regard; also a very small contribution to discover the music of the Greek composer Jani Christou, who died in 1970. I was in contact with Robert Zank, a great and enthusiastic editor in West Berlin in this time. He discovered this music and he went to Athens to discover the scores and tapes of Jani Christou, and with my Hyperion Ensemble, I was invited to record some music of Jani Christou for his German record company. I was also in Athens with Robert Zank to discover—it was a very secret and very special research because his family and his son were the only persons who had the scores and tapes. But it was a success, and also in Bucharest, I recorded two pieces with Hyperion and another two or three pieces with orchestra, the Philharmonic Orchestra Craiova. I am happy that I could help in that way the emergence of the true evolution in contemporary music. Thank you very much.

## NEW EXPERIMENTS IN ADVANCED MONTAGE: EXPERIENCES IN MUSIC VIDEO PRODUCTION

Brian O'Reilly

Today I was just going to talk about some of the working methods I used in the concert this afternoon.<sup>126</sup> Curtis Roads and I have been working together for about two years now. Around that time his book *Microsound* hadn't been published, but reading through early manuscripts of it, I started thinking of the same sort of idea of working on a frame-by-frame level. From the way I've been seeing it, there are two uses of the video camera. There's the sort of broad strokes that you get from filmmakers who set a tone, the lighting, and the scene, and then you have other people working with image which links back to Stan Brakhage, working actually on the film frame by frame. So I'm using a similar approach with a lot of these videos, which we can even go through frame-by-frame and I can show you how each one is a composition in itself. With the technology of digital versatile discs, once the DVD is available you can actually just skim through frame by frame.

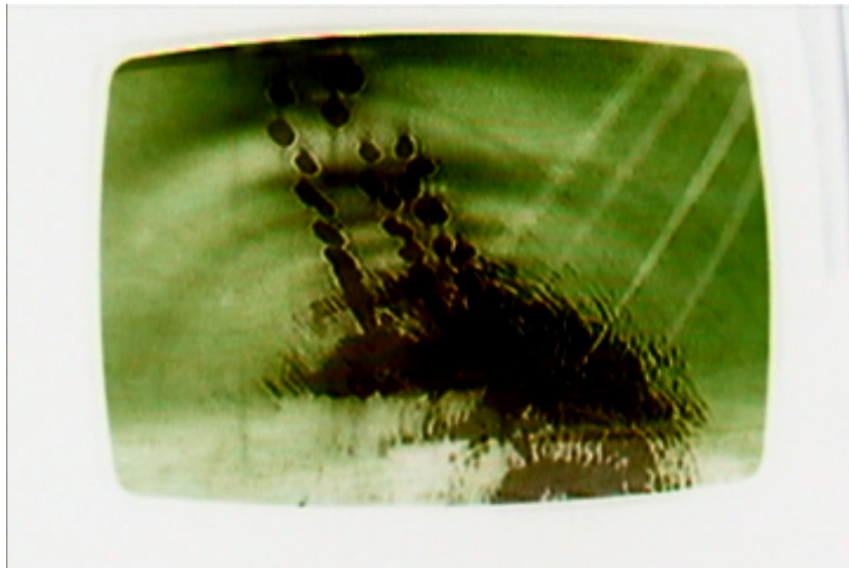
The working method that I've been using is that I'll take for each piece a very short amount of video material, maybe 30 seconds, if that, and then come up with many different permutations and then re-edit those together. I can show the piece *Half-life*, which I showed earlier today [Example 1]. The source for it is actually a very short duration, of which I can show you the original [plays excerpt 1]. This is the original footage. It's just using a slow-shutter speed driving through a tunnel, which you can see. It was at night, so you can see the lights on the tunnel's ceiling.

If we go frame-by-frame a little, as you can see there, I used some scripting and after-effects to stretch the image out [plays excerpt 2]. What you see there on each of the lines is the whole image squashed into those

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<sup>126</sup> [This text was transcribed by Robert Reigle, adjusted by Susanne Wurmnest, and approved by Brian O'Reilly.]

lines, causing different morphologies of the sound. The way we generally work is Curtis composes the pieces then gives me the finished works, to which I then edit. The first thing, I usually do all my editing in Final Cut Pro so I bring it in and just lock those tracks, and then kind of go mad, held up in the studio for a marathon editing session where I'm listening to every little thing. My favorite thing is one night, Curtis came by while I was editing, and I spent all night going through this piece, and he came back in the morning, I'm like, "Here it is!" and I could just see in his eyes, he didn't see that much difference. So you can get a little too close to things. The whole piece is constructed on just that little bit of imagery. There it is on its side as a still, the image you can see, has several other abstracted layers to it [plays excerpt 3]. I used Director to generate some images. You can use Director in many ways, most people use it for authoring CD-ROMs and it has a graphic-user interface, but the way I've been using it is as a coding language. It has Lingo, so I just have one little script that then calls to this code and manipulates still images.



**Example 1.** Still from *Half-life*.

**Audience #1 (Cevdet Erek):** In the beginning you were talking about the frames. What is a frame for you, is it the smallest part of the whole

sequence where you can make this, or does it have a high or more holy meaning?

**Brian O'Reilly:** No, it's actually physically as small as I can get, and since I work NTSC, that's 29.97 a second. I don't know whether anyone here is familiar with or uses Director. Essentially what this patch does ... I have these still images that I've prepared; (here's a still from another video), and it takes them and warps them [plays excerpt 4]. The nice thing is, it's mapped to the mouse, so intensity makes larger images, whereas if I move very slowly ...

**Audience #2 (Curtis Roads):** You need to point out that you're working live now.

**B'OR:** Oh, yeah, well I had mentioned that, that this was going to be the live part of the set. Those black moments.

**Audience #3:** This is slow motion, right?

**B'OR:** No, this is the speed that works out, from the stills.

**CE:** What if you don't do anything, is it like this?

**B'OR:** If I don't do anything it will just fade, but if you hold the mouse down it will layer over itself; I'm holding the mouse down right now. I added in that black, sort of ASC noise to write over. So you see it will stay, and kind of fade away, but it still holds those images until I let go.

**A#3:** So that would be a live performance?

**BO'R:** Yes. So generally with the live setup I'll use a video mixer and run the laptop into one input and then I'll author DVDs in DVD Studio Pro, which has its own scripting language as well, to play them at random mode, so the startup action, normally which is the government warning saying do not copy, is the script, it then looks for all of the different videos on it, and will play random ones. Different pieces have a constrained random element to them, but I'm not exactly sure what's going to come up. I generally don't do that with my work with Curtis. We have very fixed working methods. This also has several different versions; you can change it. Normally, in Director you can use it with the whole graphic interface, which I haven't gotten into so much, where you define events and how they move. Essentially, it's like Flash souped up; you can have little animated guys in there, but I just have it calling a certain number of scripts in Lingo. As you can see, there are quite a few pages of ... [plays excerpt 5]. This is all written in Lingo, so it's kind of using the language that it generates, kind of get down into it and really work those ... Because I'm not actually a big fan of Director, I just came across those.

**A#3:** Have you got an aspect of [?] for the audience to see subjective things on your work. For example, while I was watching your works today, I felt

like I was really part of a Turkish cafe, I was seeing [the land of] Oz, I was seeing human faces, but it was too short, I couldn't realize actually, completely.

**BO'R:** One of the things I do with the camera, it's more like exploring small spaces with the camera. There's the red one, which everyone always talks to me about, Sculptor [plays excerpt 6]. Everyone keeps asking me how I got the camera so close to whoever's eye it was. There's no eye in it. It's very nice when you start getting really close with the camera and extracting everyday things; people start bringing so many other associations to it. This one here, frame-by-frame [plays excerpt 7]. People keep asking me about the eyes, or different body parts, or skin, which none of that is in there. This again was made with a very small amount of material, 15 seconds of video.

**Audience #4 (Matthew Goodheart):** What was the source?

**BO'R:** A Slinky.

**MG:** Ah, excellent.

**BO'R:** It's a coiled wire that you give to children and they sit at the top of the stairs and have it walk down. You can see there "the bristling hair and eyes." I had someone who accused me of being very disgusting, what she saw in it was just not at all what it was, which is always funny, being called a pervert for doing something with a Slinky. You can see the Slinky there [plays excerpt 8]. So it's very densely layered. So mainly what I do is I just take this material and sit on it for a couple of months, and just keep working with it and eventually I'll hit on something with it and the piece will kind of come together.

**Audience #5 (David Matthews):** Is this very tightly synchronized with the music, or is it something that the synchronization is kind of ad hoc?

**BO'R:** I always edit in several rounds. I do one feverish session where I'll spend about three days editing to one piece and then step back for a couple of months and then do another round. With Curtis's music I try to have it very precise, literally sometimes it's scrubbing between one grain and constantly going back and forth to find the start point for that one hit. How long can a flicker of black be to express that musical gesture? That's usually when Curtis comes in, after I do the first round and he looks at the piece from the higher level and says, there's this whole gesture going on that I've been too focused in to see. It's pretty tight, like I said, down to the frame level. A lot of people ask what program I use to sync it up, and I tell them it's hand. A lot of people get very discouraged, "that must take you forever!"

**Audience #6 (Paul Whitehead):** There was one piece that was very synchronized rhythmically, I can't remember which number it was now, but about two-thirds of the way through the cycle, very synchronized rhythmically, I wondered ...

**CR:** *Pictor alpha*, probably.

**BO'R:** The yellow one, the one that's sort of yellowish?

**PW:** Yes, I think so.

**BO'R:** This one here?

**PW:** That was the one.

**BO'R:** [Plays excerpt 9.] The way I constructed this one, I used a piece of software called VDMX, which is based on Cycling 74s, Max/MSP, and the Soft DNS Objects. Here, I can show it to you [plays excerpt 10]. It's literally a software video mixer, so it works like hardware, where you have an A and B, and you can mix the two. It has an input for audio. So this video is essentially just two live performances of me that then I took back in and whittled away at the footage to make this. (I guess it doesn't make that much sense.) I can show you that too [excerpt 11]. It's a great little program. The only problem is the quality of it, only 15 frames a second.

**PW:** So am I right in thinking that that one was in some way different from the others?

**BO'R:** Actually, the others too—I kind of find different working strategies for each of the pieces. The piece I just showed is about two years old, whereas the first piece I showed, the white one, was just finished a few days ago. As I go on, I develop new kinds of tools in my toolbox, new ways of working with this footage, pushing and pulling it and sticking it together.

**Audience #7:** Well, maybe a rather negative remark. This kind of hard synchronization makes one easily remember the term Mickey-Mousing, and terms in the end that the sound-image combination gets more of an effect instead of being a higher level of unity, if you allow me to express it that way. So I wonder if you have other approaches towards using your images with the music, instead of, well it's too negativized in this manner, underlying the very strong effects of the music.

**CE:** Before that, may I ask one question to the questioner? Where is that Mickey Mouse effect appearing there like that? Timing may be really ... the image and the music can be really strong, not only strong, but very meaningful, the timing shall be really a strong thing. Why is that Mickey-Mouse?

**Audience #7:** Yeah, yeah, but this is a term we are using since 1928 or whatever.

**CE:** Yeah, yeah, but ...

**BO'R:** No, no, it's okay. Essentially this project of Curtis and I working together grew out of another project we were working on in graphic notation; I'm sure most people know Ligeti's *Artikulation*, the graphic score, which is wonderful. For me, this was finding new ways to actually express the music, which took on a life of its own. So when I see these pieces it's more like, I'm doing illustrations to the music.

**CR:** It's visualization.

**BO'R:** Visualization. When I work with my own video and sound, it's a whole different ball of wax; I'm free to do as I wish. But with Curtis I can't say, well, you know, maybe I'll take off a little bit of this sound; which I wouldn't do that, Curtis.

**CR:** Thank you.

**BO'R:** So for Curtis, this comes out of these visualizations. Whereas my work, there's many different things. I'm actually working on a non-linear DVD project, so it's more of a CD-ROM that you guide your way through, so there are no fixed points or poles. Yes, I use many different working strategies or strategic fictions to get me through different projects.

**CR:** Tomorrow we're going to show some other visualizations, which are more scientifically derived.

**DM:** I noticed you're a composer as well as a video artist. Do you think that the fact that you work with sound as well as video gives you another insight into working with visualizations of these pieces?

**BO'R:** I know it's a hell of a lot easier to work with someone else's music because as soon as you start editing your own thing, man, it's just like you start editing the sound to go with the image, then the image starts getting edited for the sound, and then it's this constant battle; now you have two things that you edit down instead of the one. Whereas it's just nice working with other people, you bring in the track and you lock it, and say this is the line. Like in that Cornelius Cardew score, *Treatise*, there's that one line through the whole score, through the middle. That's just a wonderful thing to have.

**MG:** My question is different. It seems like you're working from the music quite intuitively, right, grabbing whatever image you're going to use ...?

**BO'R:** Yeah.

**MG:** One of the pieces that you did was mostly black and white, and started with the squares. I found that both the way the sound and the image connected and the type of movement you had in the image, brought Švankmajer's work to mind, especially parts of *Dimensions of Dialogue*. Is that stuff in the background for you?

**BO'R:** I'm a fan.

**MG:** Yeah. But was it just coincidence that those things ...

**BO'R:** Yes, that wasn't in my thoughts when I was ... Actually that piece was a lot about video textures, because most video that you see, on repeated viewing you'll notice that there are different qualities of video. I do a lot of scan converting where I'll play a video back on my television and re-shoot it, the same 30 seconds, to just kind of degrade the image a bit more from the original DV compression. So you have this constant cycle of adding noise to it. So that one has a lot of noise. There are also a lot of these geometric shapes that are a malfunctioning video mixer, which it keeps coming back to, which I love, if you can see it.

**CR:** Why don't you show that one that you made with the film techniques, the Brakhage techniques.

**BO'R:** The source material for this is actually film, scratching and painting on film and overhead transparencies, so just a little brown paint between two of them and under a video camera, moving them slightly, and then process, of course [plays excerpt 12]. As I was saying, just trying to find the right techniques for the pieces. Normally I have Curtis's pieces for a few months and keep listening to them and then I find that the right footage just hits on it. Like with the first piece I showed, when I first heard that piece of Curtis's I thought of green. So it was just kind of waiting for the right green footage to show up before I could make it.

**CE:** In today's performance, I wonder if there was a general title for the performance, or what is the relationship between the pieces, of the little short pieces you put in line?

**BO'R:** Just the way the set moved?

**CE:** Yes.

**BO'R:** Just listening to Curtis's pieces I suggested it.

**CE:** So then to Curtis, the question is, are all these pieces selections from an archive?

**CR:** This collection is going to be released on a combined CD plus DVD on the Asphodel label, and the sequence of pieces is roughly chronological except for the first and the last pieces. Brian suggested that the first and last should be different than the chronological series.

**Audience #8:** Maybe I misheard you, but the example that you've shown, is that a single source for a given piece of music?

**BO'R:** The one with the paint, just there?

**A#8:** That one, the first one through the tunnel, was that the only source you used?

**BO'R:** Yes, just 30 seconds.



**A#8:** Is that typical of your work to use a single source for a given piece of music?

**BO'R:** On this project, yes. With my own work that I'm working on now ... it's still rather limited sources. There is just so much you can do today with processing. For me, I need to have that thread I was talking about before, to tie me to this material.

**CR:** That's also true of electronic music, you can take just about any sound and turn it into just about any other sound, at this point.

**A#8:** That's what I was thinking.

**CR:** Yes.

**Audience #9:** Do you have some examples with some other kinds of music, or what is your approach to different kinds of music, with video production?

**BO'R:** I don't have any with me, but I've started talking about working with a group out of Miami, called Phoenicia, who do some abstract, beat-driven stuff, which I'm pretty excited about. We'll have to see what life that project takes on. But I have no ideas as of yet. I just got a CD of theirs, and I have some footage that I've been looking at. For some reason I thought of ducks, so this is the only piece I've come up with so far for them [plays excerpt 13]. Since they're in Florida, I thought of flamingos and things like that, so we'll have to see what comes out of that.

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**THE MUSICAL MECHANICS OF MYSTICISM:  
A PERFORMANCE ANALYSIS OF MESSIAEN'S  
"ABIME DES OISEAUX"**

Tamara Raatz

I was first exposed to Olivier Messiaen's music a few years ago as I began studying the score of the *Quartet for the End of Time* for an upcoming performance at the Houston Holocaust Museum, and since that time, this work has held a real and lasting fascination for me. What struck me then about the quartet was how different it sounded from the Schoenberg, Berg, Webern, Bartók, and the Stravinsky that I had previously performed. It was not only the sound of the music that seemed different to me, however, it was also that the quartet seemed to be much more obviously "about" something besides the relationships obtained from the notes and the rhythms. I remember especially the powerful effect of the third movement in which the clarinet melody was unlike any I had ever encountered. The power was in the simplicity and underlying meaning of the musical statements. In regards to the tempo indications of the opening lament, Messiaen stated the following concerning the ethereal effect of time:

This slowness is not annoying. On the contrary, I have the impression that this world that we don't know must be, in effect, something rhythmic but extremely calm, calm, calm. It's a sort of superiority to silence. What I find beautiful is this musical silence. One has already left the earth at this moment. (Quoted in Rischin 2003: 42)

Messiaen's music is a perpetual dialogue between space and time, and between sound and color. The use of static time verses linear time is very important to the listener and performer of Messiaen's music. Due to his deep Catholic faith, which inspired the creation of wonder, mystery, awe, and even eternity (which is definitely non-temporal), Messiaen used the rhythms and modes to re-enforce the passage or non-passage of time. My study has helped me realize that if I see, hear, and speak through these fundamental notions I can begin to approach the unknown. As a performer, I understood that there were no ordinary moments in this masterpiece. To find the true

essence of the work I had to go to the place where silence reigns, to understand the power of stillness in a musical passage. As you may have gathered from the title of my paper, I will be concerned with both the technical aspects of Messiaen's music—something I term his “musical mechanics,” and with the aesthetic ends to which these musical mechanics are applied—ends which in many cases may be considered “mystical.”

I would like to suggest that it is precisely the ways in which the technical components of the music interact with the other—what some might call “extra-musical”—contexts of the music that are most interesting. That is, I think of the musical mechanics in Messiaen's music generally—and in the quartet in particular—not so much as ends in themselves, but rather as means to another kind of end. In order to support such a claim, I shall identify the technical means themselves—that is, present the nuts and bolts of the music; and show how these means are employed to some other end—that is, how the nuts and bolts of the music have some kind of meanings beyond their sheer technical ones. In short, I want to understand how the music is put together in technical terms, but preserve my original intuition that the music is ultimately “about” something else. The elements of Messiaen's musical language are united: a rigorous and complex technique at the service of beauty true and simple, whether of an earthly or heavenly order. Sustained as he was by his faith, the composer never mistakes the means for the end. His music has a universality that makes Messiaen one of the true innovators of the 20<sup>th</sup> century.

Debussy himself wrote:

Music alone has the power to evoke as it will the improbable places, the unquestionable and chimerical world which works secretly on the mysterious poetry of the night, on those thousand anonymous sounds made when leaves are caressed by the rays of the moon. (Quoted in Griffiths 1994: 10)

The prose is typically enigmatic and replete with images, but the reference to dreaming is clear enough. This process of elevating music to a more ethereal state is the cornerstone of Messiaen's works.

Before turning to the technical discussion, though, I would like to relate to you the background of the composer and his work. Born in Avignon in 1908, Olivier Messiaen was to become one of the most individual composers of the 20<sup>th</sup> century, developing a harmonic and melodic language that was, for some, to come to be regarded as the epitome of the bond that exists between music and spirituality. Regarded by many as France's greatest living composer, for 60 years he was at the forefront of a period in which music and its language was to change more quickly and fundamentally than

in any other period in history; Messiaen was a chief protagonist in that period, both as a composer and as a teacher. His works are richly varied, but underlying all is a deep spirituality that is rooted in his ardent Christian beliefs and his deep love for nature, which he regards as God's masterpiece. His later music is inspired by the sounds of nature, and, in particular, birdsong, which he regarded as the most natural of all music.

The advent of World War II seriously disrupted Messiaen's life as a musician, but also led to the composition of one of his most appealing works. Although a pacifist, married, and the father of a two-year-old son, Messiaen volunteered for the hospital corps. The German advance overtook him in June 1940 while he was serving as an orderly in a French army hospital. Herded into cattle cars, Messiaen and his fellow prisoners of war were shipped across Germany to Görlitz, Silesia, where he was imprisoned in Stalag VIII-A. Görlitz is approximately 50 miles east of Dresden and though it now lies within the borders of Poland, it was part of Germany before and during the war. There he suffered terrible deprivations—food was scarce and prisoners were provided with just enough to keep them alive. Somehow, he had managed to take with him a knapsack stuffed with Bach's Brandenburg Concertos and scores by Ravel, Beethoven, Berg, and Stravinsky.

The camp commander soon discovered this bespectacled prisoner with all the scores, and gave him manuscript paper and a quiet place to compose. According to Messiaen, the quartet was directly inspired by the following quotation:

I saw an angel of great strength descending from the heavens, cloaked in a storm-cloud, with a halo above his head. His face was like the sun, his feet like pillars of fire. He placed his right foot on the sea, his left foot on the land, and standing upright on sea and land, he raised his hand toward heaven, and made a vow to Him who sees down the ages, saying: There shall be no more time; but on the day the trumpet of the seventh angel sounds, the mystery of God will begin.

(*Revelation*, Chapter X: 1-7)

Taking his title from *Revelation* X: 6, the title worked at several levels: the work was about the apocalypse, but it also was a pun—the quartet separates rhythm from meter, so it is for the end of “time.” The angel crowned with a rainbow was both savior and muse. The source of inspiration for Messiaen's quartet, it was also his source of consolation in the face of hunger, cold, and demoralization in Stalag VIII-A. *Revelation* was written in a time of great persecution of the Church as was the *Quartet for the End of Time* composed at a time of great tribulation.

Previously, Messiaen's only compositional ventures into chamber music had been in the two works for violin and piano. Like the organ cycles, the quartet is a sequence of related meditations; it mixes purely monodic sections with others that are chordally conceived. The focus of my discussion is the third movement, entitled "Abime des oiseaux," which is in the monodic style scored for clarinet alone. Abyss is primarily and classically an adjective, meaning deep, very deep. In the New Testament, the abyss refers specifically to the abode of the dead, limbo, the abode of the evil spirits, a dark and hidden place, or hell. In contrast, the birds refer to spirituality and God. Through the song of the birds there flows the single-minded will to live, to survive, to preserve wherever and as long as possible every vestige of dignity and self-respect.

In the performance notes (translated from the French by Charles Briefer), Olivier Messiaen wrote:

Conceived and written during my captivity, the *Quartet for the End of Time* was given its first performance in Stalag VIII-A on the 15<sup>th</sup> of January 1941. This took place at Görlitz, Silesia, in atrocious cold. The stalag was buried under the snow. (Messiaen 1942)

The work featured violinist Jean Le Boulaire, clarinetist Henri Acoca, the famous cellist Etienne Pasquier, and Messiaen was the pianist. Messiaen states:

We were thirty thousand prisoners (French for the most part, with a number of Poles and Belgians). The four performers played on broken instruments: Etienne Pasquier's cello had only three strings; the keys on my piano would go down, but they wouldn't come up again. Our costumes were incredible. I'd been outfitted in a completely tattered green jacket and I wore wooden shoes. The audience included all classes of society: priests, doctors, "petits bourgeois," career soldiers, workingmen, and peasants.

When I was a prisoner, the lack of nourishment gave me colored dreams. I saw halos and strange swirls of color. But the choice of "The Angel Who Announces the End of Time" rests on much more serious reasons. As a musician, I work with rhythm. Rhythm is, in essence, change and division. To study change and division is to study Time. Time—measured, relative, physiological and psychological—divides itself in a thousand ways, of which the most immediate for us is the endless conversion of the future into the past. In Eternity, these things will no longer exist. What problems! I have presented these problems in my *Quartet for the End of Time*. But, to tell the truth, they

are based on my investigations into sonorities and rhythms over the past forty years.

In the name of the Apocalypse, my work has been criticized for its tranquility and economy. My detractors forget that the Apocalypse does not contain only monsters and cataclysms. One can find there as well the silences of adoration and marvelous visions of peace. Furthermore, I never intended to create an Apocalypse. I was concerned with a beloved figure (that of “The Angel Who Announces the End of Time”), and I wrote a quartet for the instruments (and instrumentalists) I had at hand, namely a violin, a clarinet, a cello and a piano.

One last remark: my Quartet is in eight movements. Why? Seven is the perfect number—the six days of creation sanctified by the divine Sabbath. The seventh day of rest prolongs itself in eternity and becomes the eighth, of faultless light, of unalterable peace.

(Messiaen 1942)

The translation of the title of the third movement from the quartet is the “Abyss of the Birds.” Messiaen states the following concerning this movement:

Clarinet alone. The abyss is Time with its sadness, its weariness. The birds are the opposite of Time; they are our desire for light, for stars, for rainbows, and for jubilant songs. At the beginning, sadness. Notice the unusually wide range in the clarinet’s dynamics: *pianissimo*, *crescendo molto*, up to the most furious *fortissimo*. The songs of the birds are written in the gay, whimsical style of the blackbird. The return to desolation takes place lower down, in the beautiful, somber chalumeau register of the clarinet. The ending is built around an arpeggio, based on a dominant chord heard frequently in the course of the work. (Messiaen 1942)

Let us now turn our attention to the technical aspects of the quartet. I will restrict my remarks to this third movement. Through a performance analysis, I will discuss and illustrate the inventive compositional elements incorporated into this work, such as nontraditional modal scales and the adaptation of rhythmic techniques from non-Western music and medieval music. In addition, Messiaen was intensely interested in tone colors and he also turned to the natural world for inspiration, especially to birdsongs—particularly the *merle* (blackbird). Through a visual and aural understanding of the structural symmetry of the seven musical sections of the third movement, the musical mechanics will unfold as they relate to Messiaen’s religious philosophies.

Table 1 is an analytical outline of the tonal centers of the movement.

**Table 1. “Abimes des oiseaux”: Analytical Outline**

SECTION	MEASURES	TONAL CENTER	COMMENTS
A	1-12	F $\sharp$	Small interval range
B	13-26	F $\sharp$ – C	The birdsong
C	27-31	C $\sharp$ – C – G	The contrast of range and dynamics
A	32-43	F $\sharp$ – G	The return of the A material an octave lower
C	44-45	G – F $\sharp$ – A	The melodic material is moving in contrary motion to mm. 27-31
B	46	F – A	<i>Presque vif</i>
A	46	F $\sharp$	The last four pitches are the same four-note set as in m. 1

As you can see, the formal structure of the third movement is symmetrical: ABC – A – CBA. The movement is compositionally balanced through the placement of the A material at the beginning, midpoint, and end of the composition. It is interesting to note that the last three sections of the movement are a mirror reflection of the first three sections of the movement. The unique and artistic statement of the Trinity is masterfully underscored. The slow A section is clearly suggestive of the abyss, probably a reference to John’s prophecy in *Revelation XI:7*, “the beast that comes up from the abyss will wage war,” and the lively B section representative of the birds (Matheson 1995: 235). Far above the horror of the abyss, birds fly in joyous freedom. To Messiaen, birds symbolized our longing for light, but also our desire for flight:

It is in a spirit of no confidence in myself, or I mean in the human race, that I have taken birdsongs as a model. If you want symbols, let us go on to say that the bird is the symbol of freedom. We walk, he flies. We make war, he sings ... I doubt that one can find in any human music, however inspired, melodies and rhythms that have the sovereign freedom of birdsong. (Quoted in Hold 1971: 122)

The movement contains seven sections. Messiaen was fascinated with prime numbers, and seven, being a prime number, also contains important

symbolic religious significance. The movement of the tonal centers as well as the melodic materials seems to emphasize half-step motion. Also, the contrasting dynamic power of measures 13, 21, and 44 reiterate the F<sup>#</sup> as the primary tonal center.

Messiaen considered rhythm to be the most essential part of music. The ancient Greeks defined rhythm as “the ordering of movement” (Johnson 1975: 33). According to Messiaen, the greatest rhythmician in classical music was certainly Mozart. Mozartian rhythm emphasizes accents, derived from words and speech.

In contrast, Messiaen’s philosophy in regards to rhythm was the following: “Rhythmic music is music that scorns repetition, straightforwardness, and equal divisions. In short, it’s music inspired by the movements of nature, movements of free and unequal durations” (quoted in Samuel 1967: 33). A very striking example of non-rhythmic music, according to Messiaen’s rhythmic language, is the military march. The march, with its cadential gait and uninterrupted succession of absolutely equal note-values, is anti-natural. Military music, according to Messiaen’s theory, is the negation of rhythm (Bell 1984: 33). In “Abime des oiseaux,” the alternation of movement and space creates a natural motion in the melodic contour. The use of the birdcall also creates variety in musical motion. Rowan Williams states, “If music is the most contemplative of the arts, it is **not** because it takes us into the timeless but because it obliges us to rethink time” (quoted in Begbie 2003: 29).

At the age of 11, Messiaen was given a score of Debussy’s *Pelléas et Mélisande*, which he described as a revelation:

Debussy’s music is like water. Water is still and doesn’t move, but if you throw a stone in, there is an immediate shock wave around the stone and the water starts moving. Debussy’s music is like that. There are sudden pauses and all of a sudden it moves. It was the pauses that struck me. (Quoted in Griffiths 1994: 23)

This statement at age 11 sets the groundwork for the development of Messiaen’s compositional philosophy and style—the importance of silence as a structural device and spiritual meditation.

It is clear that Messiaen was drawn to certain types of musical material in his composing. He referred repeatedly in his book *The Technique of My Musical Language* to something he called “the charm of impossibilities.” By this he meant that, for example, each of his Modes of Limited Transposition is structured such that no tone can arise as a tonic—the modes that he enumerated are symmetrical arrangements of pitch classes that turn back upon themselves tonally and confuse our usual sense of tonality.



In his early works, such as the *Quartet for the End of Time*, he used Modes of Limited Transposition (Messiaen 1956: 21). The Modes of Limited Transposition form the basis of melody as well as harmony. Their chief interest lies, however, in the variety of harmonic color that they provide. They are based on the equal-tempered chromatic scale and they divide the octave into two, three, or four equal intervals, each interval being subdivided into the same relationship of tones and semitones. Mode 2 (C-D-E♭-E natural-F♯-G-A-B♭-C), used in “Abime de oiseaux,” is the mode that he used most frequently.

To what can Messiaen’s extraordinary sensitivity to color be attributed? Messiaen acknowledged that he was not the first composer to associate colors with sounds. As he pointed out, from Mozart to Chopin to Debussy to Wagner, composers have employed certain chords to deliberately create or evoke images of color (Samuel 1967: 18). Like Debussy, Messiaen used timbre as a structural device, elevating it to an importance equal to that of pitch and duration (Boucourechliev 1980: 206). Messiaen traced his first colored emotion, however, to his childhood, when he viewed the stained-glass windows of Sainte Chapelle in Paris for the first time. “For me, that was a shining revelation, which I’ve never forgotten, and this first impression as a child—I was 10 years old at the time—became a key experience for my later musical thinking” (Messiaen 1986: 78).

How does Messiaen’s music relate to the established rules of classical tonality? There are tonal passages in the work but they are blended with Mode 2, which colors the “tonal” structure. Messiaen considers the terms “tonal,” “modal,” “serial,” and other words of this kind illusory and that their use is based on a misconception. He states, “they’ve been exploited in books because lovely theories can be drawn up with pretty synoptic tables. But these are unimportant things, as composers have finally found out” (quoted in Samuel 1967: 23). The modes themselves do not imply a particular tonality, but they can be made to slip easily from one tonality to another without any real sense of modulation.

Messiaen associated his modes with very precise colorings: “Mode 2 revolves around certain violets, blues, and violet-purple, while Mode 3 corresponds to an orange with red and green pigments” (quoted in Samuel 1967: 20). The effect of brilliancy is to be obtained principally from the oppositions of cool colors with warm colors, and the oppositions of grave colors with bright colors. If all the colors are bright there is no brightness. Thus, brilliancy is going toward color, not toward white. We can see these color contrasts in the spectral writing for the clarinet in the third movement of the quartet.

Violet is a complex color because it blends blue, an extremely cold color, with red, an extremely warm color; but violet is capable of many nuances: there is, for example, a violet in which red dominates and which is called purple, and, at the other end of the scale, there is a violet containing more blue than red, called hyacinth-blue. These two violets have great importance: in the Middle Ages, in symbolism and in stained glass, the one represented the love of truth, and the other the truth of love. And this reversal of terms is certainly not just a play on words but corresponds without doubt very closely to these nuances of violet (Samuel 1967: 20). Leonardo da Vinci believed that the power of meditation could be magnified ten-fold under the violet light falling through the stained-glass window of a quiet church. The versatility of the color violet is a visual description of the musical contrasts contained in “*Abime des oiseaux*.” For example, the opening lament is in contrast to the spirited music of the bird but the two ideas are symbolically related. It is important to remember that Messiaen was creating the sensation of violet rather than the color violet. Do not think of the notes as paints, but get the quality of light. Black is always thought of as a neutralizer of color. It should be better remembered that white is also a neutralizer of color. It serves to bring the color up out of the depths. Thus, the contrasts in the color palette closely relate to the contrasts in compositional elements. If it is possible that there are “mysterious” colors in a picture it is also possible that there are “mysterious” lines and forms. There are some painters who deal with the play of light as the most gracious thing that exists—Messiaen speaks through the spectrum of tonal colors and contrasts. Good composition is like a suspension bridge; each line adds strength and takes none away. Messiaen’s composition reveals the relationship of elements. Simply making musical lines run into each other is not composition. There must be motive for the connection. Messiaen carries the listener and performer through a canvas, each part tied up with another part. Never does the space in the canvas seem empty of purpose.

As well as his interest in modal colors, his strong faith in Roman Catholicism and his position as organist in a Catholic church led to his independent studies of plainchant. Messiaen called plainchant an “inexhaustible mine of rare and expressive melodic contours” (Bell 1984: 8). Chants may be classified based on the relationship of notes to syllables. Those in which most or all of the syllables have a single note each are called syllabic; those characterized by long melodic passages on a single syllable are called melismatic. The monodic musical line of Section A of “*Abime des oiseaux*” follows the plainchant arch shape as well as revolving in a limited interval range around one tonal center, F $\sharp$ . Messiaen’s study of medieval

chants and modes affected the direction and meaning of this opening statement.

These modal symmetries can defeat the usual listening strategies for hearing meter and tonality, and this is what Messiaen finds so attractive; we are thrown from our comfortable, grounded world of musical orientation into a musical environment in which the old rules no longer apply. We have a musical experience that may suggest to us what a spiritual experience would be like that transcended our fundamentally human notions of time and space. Messiaen does not let beauty in the subdivisions destroy the beauty or the power of the major divisions.

Messiaen reinforced this heavenly vision through his violin and clarinet parts. For the first time in his own writing, Messiaen incorporated birdsongs, perhaps inspired—as have been so many prisoners before him—by the sight of birds free to fly over the prison walls. He would later describe birds as “little prophets of immortal joy” (quoted in Hold 1971: 122); here he wrote flourishes reminiscent of the blackbird and nightingale for the clarinet.

During the period 1941 to 1953, Messiaen became an amateur ornithologist and continued to spend much time studying birds in their native environment. He found that each species had its own specific song. Messiaen states:

Some birds have an innate song, that is to say that they are born with a certain song style and as soon as one hears them, one says right away, “That’s a blackbird! That’s a thrush!” just as at a concert of classical music you can say, “That’s Mozart! That’s Debussy!”

(Quoted in Bell 1984: 53)

According to Messiaen’s notes, the birdsong used in the third movement is of the blackbird. The blackbird has a song which is both solemn and bantering. Every spring each blackbird invents a certain number of themes which it retains and which it adds to previous themes; the older it gets, the vaster its repertory of melodic motifs becomes, and these motifs are peculiar to each individual bird (Johnson 1995: 251). Messiaen captures the essence of the blackbird’s song in the contrast of the opening lament with the bantering melodic material of Section B, as well as in the combination of thematic motifs.

In studying his writings pertaining to other members of the *merle* species, I found that the nightingale was noted to perform songs of sadness and joy. Messiaen states that the nightingale appears to be “passing brusquely from sadness to joy, from anger to renunciation, from rancor to forgiveness and from supplication to victory. And the nightingale’s song goes from slow to rapid tempi, from *pianissimo* nuance to a *fortissimo* with obvious contrasts”

(quoted in Bell 1984: 53). As I studied the musical ideas of this movement, I came to the conclusion that Messiaen's bird is somewhat of a hybrid of the blackbird and the nightingale.

The title of the *Quartet for the End of Time* might suggest that it was written in response to imprisonment, but Messiaen has resisted any such interpretation and emphasized rather its dependence on the imagery of the apocalypse contained in the Revelation of St. John the Divine. The score is inscribed "in homage to the Angel of the Apocalypse, who raises his hand heavenwards saying: 'There will be no more Time.'" One can contemplate the literal interpretation of this passage; but the reference to time also expresses Messiaen's own philosophical views with regard to musical time, particularly his need to abolish the equal and divisive durational time of traditional music.

Messiaen's revival of chant style, and his creation of artificial modes, combine with his musical rhythmic language to create a unique musical package in this movement from his *Quartet for the End of Time*. His desire was to restore music to its original, ancient character, as in the magical and incantatory expression of the religious spirit. Messiaen's techniques formed the basics for his attempt to communicate with the cosmos and rediscover the original magical forms of human expression identified as "prayer incantations" and rhythmic dances.

Messiaen uses the means I have described—the stylized birdsongs and the modes of limited transposition—to project a sense of timelessness; but in great art there is no beginning and end in point of time. All time is comprehended. Considering all this, one might wonder whether Messiaen sets out to depict the end of time literally in the music; is this a kind of musical representation of eternity? Messiaen has denied that he ever tries to offer such literal translations of spiritual states into tones. It is perhaps better to think of the piece as **evoking** such an image through specifically **musical** means. That is, the sense of static temporality that a listener experiences in hearing this piece is a musical experience that may correspond to a parallel spiritual experience, but it is not that spiritual experience, nor does it try to imitate such an experience. Thus, if one is convinced that Messiaen's music is ultimately about something besides—or beyond—its purely structural properties, it is precisely Messiaen's musical mechanics that make the mystical aspect of his music possible.

The scope of Messiaen's imagination is stunning. The great revolutionary works of the previous generation can be seen as logical developments of 19<sup>th</sup>-century traditions. Messiaen's work, however, is without precedent. And the sheer sonic beauty of Messiaen's textures and

melodies dazzles. Robert Henri, the great American painter, stated the following about the wonderment of the masterpieces:

Artists have been looking at Rembrandt's drawings for three hundred years. Thousands and thousands of remarkable drawings have been made since, but we are not yet done looking at Rembrandts. There is a life stirring in them. All manifestations of art are but landmarks in the progress of the human spirit toward a thing but as yet sensed and far from being possessed. (Henri 1923: 66)

Musicians and scholars have been studying and contemplating the complexity and artistry of Messiaen's *Quartet for the End of Time*, and Robert Henri's statement about the imprint of a masterpiece is quite compelling and revealing.

Messiaen was particular about the sound in the third movement. In his numerous writings he refers to the elevation or ascent. The movement is not traditionally clarinetistic. It transcends virtuosity. Instead of exploiting the technical agility of the clarinet, Messiaen combined slow tempo with the clarinet's color and tessitura to create an atmosphere of the beyond, the aura of eternity with which the quartet is bound. His music is not about instrumentation; it is about something far beyond that. That is where the great genius of Messiaen lies.

Jean Le Boulaire, the violinist who premiered the *Quartet for the End of Time*, stated the following about the spiritual radiance of Messiaen:

I'm going to confess something. I am a man who does not believe at all. I don't believe in God. I believe that Christ was a man who existed, but that's all. Yet when I heard Messiaen's music, I suddenly thought that it was possible that there was something. For thousands of reasons: his way of expressing himself, his kindness, his graciousness, his deep studies of music, his love of birds, of wind, of nature. All this made an extraordinary impression on me. I stumbled upon the question of the divine, but with Messiaen's music I suddenly said to myself: God. (Quoted in Rischin 2003: 44)

It can be called miraculous that Messiaen found himself imprisoned where his abilities would not only be recognized by the camp commander, but also encouraged and even rewarded by a performance. But what is most miraculous about this quartet is its character. This is deeply peaceful and joyous music, yet a prisoner in the middle of war writes it in a prison camp, about the end of the world. This is not the kind of work one would most likely expect under such circumstances. It is clearly evident that it would be a mistake to think that spirituality is seen only through a mist.

While many World War II-inspired works have understandably been absorbed with the problem of the absence of God, Messiaen's quartet is not. The message the quartet radiates is not one of despair, but, on the contrary, one of resounding reaffirmation that those with faith shall prevail and those who persecute will perish. In the midst of chaos, Messiaen wrote about the apocalypse in a completely "unapocalyptic" manner. In the previous century, the sequence from the Requiem Mass had given composers the opportunity to unleash all the thunder they could muster to depict the horrific details of God's day of accounting. Berlioz and Verdi had both written depictions that chill—or more honestly perhaps, thrill—us to this day. And not too long after Messiaen's quartet was completed, Schoenberg, Shostakovich, Britten, and Penderecki would write pieces expressive of the horrors of the Nazis and their war, music full of screams, howls, and cries for righteous justice against the oppressor, which reinforced the battle between secular power and spiritual power.

Pablo Casals stated the following concerning the purpose of art:

Art should be used as a means of keeping alive the cult of an ideal, instead of for the propagation of morbid tendencies towards disintegration. Why should an artist be obsessed by the uncertainties of our time, instead of reacting against them by showing his faith in those human values, which have survived so many collective catastrophes? The artist, as a man, will always find occasions to intervene, if he thinks he should intervene, in the conflicts of his time. But art cannot be the slave of these conflicts. However dark our times may seem, art should bring a message of hope.

(Quoted in Corredor 1956: 178)

This message of hope is clearly outlined in Messiaen's musical works. Messiaen's philosophies had no place for neo-pagan hysterics. In the middle of a prison camp, a prisoner unsure if he would ever again see his family or home, Messiaen composed a vision of heaven where anger, violence, vengeance, and despair are not so much repressed as irrelevant. This work has nothing to do with war, or prison, or "man's inhumanity to man." There is no darkness here. There is no bitterness. There is no rage. Instead, there is power, light, transcendence, ecstasy, and joy eternal. So, embossed into his music is the ecstatic worship of images from the Christ story, visions of heaven and of the apocalypse, the rapturous focusing on stained glass windows, and the thread of plainsong giving a timeless continuity.

There are moments in our lives; there are moments in a day, when we seem to see beyond the usual. Such are the moments of our greatest happiness. Such are the moments of our greatest wisdom. If one could but

recall this vision by some sort of sign ... It was in this hope that Messiaen created this work—signposts on the way to what may be, signposts toward greater knowledge.

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## ***...of one sinuous spreading...: AN EXPLORATION OF TIMBRE, STRUCTURE, AND MUSICAL CHOICE***

Paula Matthusen

In exploring how to create an improvisation-based composition affected by the analysis of musical spectra for prepared piano and live processing, the title of the piece originally envisioned changed from *ongoing* to *...of one sinuous spreading...* [CD 1: 15]. The goal of the piece has remained the same; that being the creation of a piece and an interface that allows for an improvisation whose structure and development are influenced by the analysis of the spectra produced during the performance. The title *...of one sinuous spreading...* refers to Jorge Luis Borges's work "The Garden of Forking Paths." In this short story, scholar Steven Albert conceives of a novel (also called *The Garden of Forking Paths*) as "really a labyrinth because it is based on a radical reconception of time..." (Murray 1997: 31). As Albert states, "In all fiction, when a man is faced with alternatives he chooses one at the expense of others. ... He thus **creates** various futures, various times which start others that will in their turn branch out and bifurcate in other times" (Borges, cited in Murray 1997: 31). The original conception for this piece was based loosely on cellular automata, but as the piece progressed, it has become much more focused on the issue of making a choice at the expense of others and what this might imply for the trajectory of an improvisatory piece. In this way, the piece has become much more of a game-like duet between a pianist and laptop performer in which both navigate different musical "routes" constructed within the piece together in order to find a suitable ending.

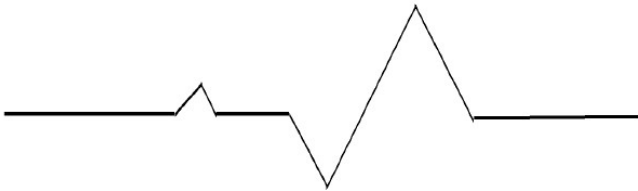


The navigation of these musical routes begins with the pianist interpreting a basic shape notated in the score [Example 1]. The shape can be interpreted in terms of pitch, dynamic level, and/or rhythm. This simple shape can be performed with or without preparations and is repeated until the pianist arrives at a new point within the composition, at which point the score specifies a basic transformation and/or alteration to make of the shape. While the pianist is performing the shape, the laptop performer both



analyzes and interprets the pianist's performance of the shape, and processes a given set of simple piano samples according to the pianist's performance.


**Beginning Shape:**  
 Play anywhere on the piano, with or without any preparations.  
 Keep the shape extremely simple and short. Repeat (all) shapes until moving to another section.  
 The shape can be interpreted in terms of pitch, rhythm, and dynamic level.



If samples are  
**PITCHED TONES**  
go to "P"

If samples are  
**PERCUSSIVE & largely UNPITCHED**  
go to "O"

**Interruptive Gesture:**  
*For Piano*  
 Perform at any time, EXCEPT within the midst of an ending procedure.  
 Play in any register and at any dynamic, repeat until electronics stop.



**Interruptive Gesture:**  
*For Computer*  
 Super-accelerate all samples & fade out.

### Example 1. Beginning Shape.

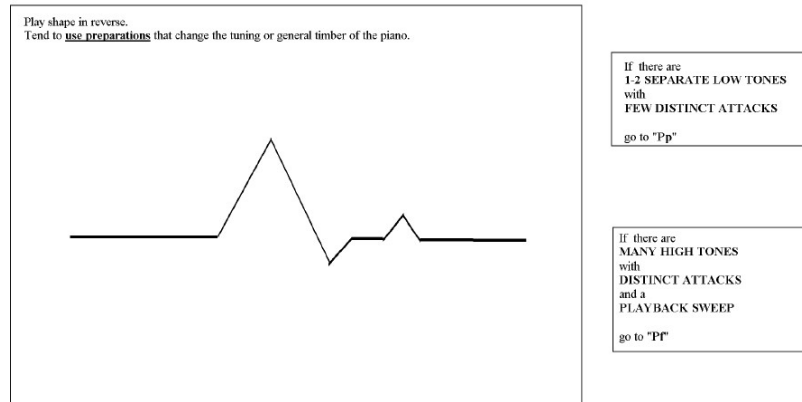
During the pianist's first performance of the musical shape, the laptop performer chooses a tiny segment of the sonorities produced and analyzes the first seven partials in Max/MSP. The ratios between these partials are then calculated by dividing the higher partials by the lowest partials. Thus, the lowest recorded frequency becomes 1, and the higher partials above that become 1.78, 2, or 3, depending on how inharmonic or harmonic the partials are. If a large number of the ratios contain fractions, pitched tones form the

basis of the samples played back. If the majority of the ratios are whole numbers, the samples processed are percussive and unpitched. The performance of either pitched or percussive tones then acts as a cue for the pianist such that she goes to a section denoted as “*P*” in her score, if the tones are pitched, or “*O*” if they are unpitched or percussive. If she goes to the “*P*” section of the score, she then performs a transformation of the shape by playing it in reverse and using preparations or extended techniques that alter the general timbre of the piano. If she goes to the “*O*” section, she plays the inverse of the shape and avoids preparations that alter the general timbre of the piano. The letters “*P*” and “*O*” stand for *prepared* and *ordinaire*. Once she has traveled down one of these two paths, each route she takes thereafter will further build on the specifications of playing either largely with preparations or *ordinaire*. The score has tabs so that both performers can move from page to page easily as each decision is made. The binary distinctions between *prepared* and *ordinaire* are not necessarily as strict as they may seem by using this terminology in combination with a binary decision, but moreover, because of their generality, provide a useful means of focusing the directions of the musical routes as they begin to point toward a specific ending.

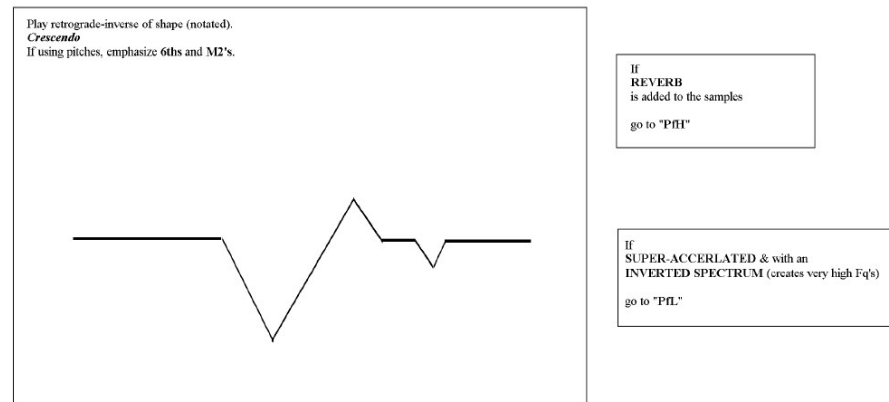
Let’s pretend that the pianist has performed something that produced a largely non-integer set of ratios and that we are proceeding down the musical route denoted as *prepared* [Example 2]. The pianist is already performing the shape while tending to use preparations. The laptop performer then analyzes a selected moment of sound once again. The ratios this analysis produces become translated as playback speed for the percussive samples. Seven separate sample tracks are maintained within Max/MSP that loop the same sample. Thus, if a large number of partials are present in the sounds analyzed, many pitched tones with distinct attacks will be produced as a result of the higher ratios multiplying the playback speed of the samples. If few ratios result from the analysis, few pitched tones will be present since the processing will likely feature one to two multiplications of the original playback speed of the sample. This forms the basis of the next cue for the pianist, such that if there are “few pitched tones” she would go to “*Pf*” (meaning *prepared* and *forte*), and if there are many “separate pitched tones” she would go to “*Pp*” (*prepared* and *piano*). Once at “*Pf*” [Example 3], for example, the pianist would transform the shape again by transposing it higher, playing the retrograde-inversion of the shape, and emphasizing sixths and major seconds.

This back and forth between the pianist’s decisions and processing continues, further refining the performance of the shape until the “route”

directs the performers toward a particular ending. There are 16 possible endings to each of these routes. 12 of these endings are much more specific and feature through-composed piano parts and sound files.



### Example 2. *Prepared (Forte or Piano?)*.



### Example 3. *Prepared Forte (High or Low?)*.

An example of one of these endings is Section 3A [Example 4]. The piano part and pre-composed sound file for these endings were derived in a manner consistent with the structure of the piece. In an early recording session,

Kathryn Woodard performed the basic shape, transforming it at different points according to different levels of specification based on pre-structured musical routes. Thus, she started playing the shape, then continued to play it in a manner that emphasized or avoided preparations, then transposed the shape higher or lower depending on the route she traveled down.

The image displays a musical score for a keyboard instrument, divided into two systems. The first system begins at 0:00 and ends at 0:32. It features a series of notes on a staff, with various performance instructions in boxes and text. These include: "tap fingers (w/ flesh) on soundboard", "keep pitches undampened w/ sostenuto pedal", "tap fingers (w/ nail) on soundboard", "strike sound board with ball of wrist", "keep pitches in sostenuto pedal", "tap fingers (w/ flesh) on undiked", "cut off w/ finger, allow tones to keep vibrating", "strike undiked w/ palm", "silently depress cluster, gradually release tones to reveal the fifth", and "hold in sost. pedal". The second system starts at 1:08 and ends at 1:40. It includes instructions such as "high perc return", "etc...", "tap fingers (w/ flesh)", "strike w/ palm", "strike w/ knuckle", "tap strings w/ fingertip", and "ppp". The score is written for a keyboard (Kbd.) and includes a sostenuto pedal.

#### Example 4. Section 3A.

She performed all possible routes, and the sounds from these explorations formed the basis of the sounds used for the ending sound files at the end of the piece. Additionally, the frequencies of these sounds were analyzed and influenced much of the selected pitch material for the endings of the piece. In this way, the eight complete endings acquire their uniqueness, but also hopefully have a sense of coherence, because they were derived from a similar manner of sonic exploration and exaggeration.

Only eight of these twelve endings successfully complete the piece; the other four endings eventually direct the performers back to a different

section within the piece such that they must begin navigating the musical routes from a completely different location within the labyrinth [Example 5]. Four more of these routes are largely impossible, as seen in [Example 6], in which the pianist is instructed to abruptly leave the performance space, buy cheese and crackers, return to the performance space and use the piano strings to slice the cheese, so that the piece ends once everyone in the audience has a cracker with cheese upon it. In the event that the performers come across such an undesirable ending, either or both must interrupt the process by playing the “interruptive gesture.” The “interruptive gesture,” as notated in the score, can be performed at any tempo, dynamic, or register. Once an interruptive gesture is performed, both the pianist and the laptop performer return to the beginning of the piece and begin the exploration of the various musical routes again. This integrates a deeper level of choice into the piece such that the performers can avoid impossible endings and further direct their performance towards endings they prefer. The length of this composition is thus indeterminate.

The musical score for Example 5, Ending, is presented in two systems. The first system covers the time range from 0:00 to 0:47. The piano part (Piano) features a melodic line with dynamic markings of *ff*, *p*, *f*, and *p*. It includes performance instructions such as "pluck these pitches rapidly, vary speed and accentuation" and "undampen these pitches using the sostenuto pedal (note: all are one octave higher!)". The laptop part (Laptop) includes a "how'd turn" instruction and a "pluck slowly" instruction. The second system covers the time range from 0:52 to 1:33. The piano part continues with a "pluck slowly" instruction and a "drop ping pong balls on the strings" instruction. The laptop part includes a "single plucked voice begins" instruction and a "repeat 3x" instruction. The score concludes with a final measure at 1:33.

**Example 5. Ending.**

Continue to *decrescendo* until nearly inaudible.  
 Begin using unpitched sounds. Create increasingly long silences between each attack.  
 Once completely inaudible & with enough space between each attack, abruptly leave the performance space & run to the nearest cornerstore.  
 Buy cheese and crackers, return to the performance space & use the piano strings to slice the cheese.  
 Place cheese on crackers, and distribute to audience.  
 The piece ends when everyone has a cracker with cheese upon it.



#### Example 6. *Prepared High Piano Slow.*

It is through this use of choice and musical routes that I hoped to explore the relationship between improvisation and the spectra of the sounds produced during the improvisation, and how this relationship affects the trajectory and outcome of the overall piece. The various endings within the piece, even if they end up using the same sound file, are constructed such that they can sound uniquely different. Specifically, each sound file appears twice, but each time in the context of a different musical path with its own unique (and divergent) musical past. In this way, the pianist and the laptop performer explore a variation on “the garden of forking paths.” Doing so requires both willingness to explore the particulars of a sound and openness to the ramifications of that performance. Similarly, in Borges’s story Albert invites his guest Yu Tsun into a discussion (and analysis) of the work *The Garden of Forking Paths* by stating:

In the work of Ts’ui Pên [who wrote the work *The Garden of Forking Paths* within the story], all possible outcomes occur; each one is the point of departure for other forkings. Sometimes, the paths of this labyrinth converge: for example, you arrive at this house, but in one of the possible pasts you are my enemy, in another, my friend. If you

will resign yourself to my incurable pronunciations, we shall read a few pages. (Borges 1964: 26)

In my reading, it is significant in Borges's work that the discussion of the forking paths involves Albert meeting Yu Tsun, as well as his invitation that Yu Tsun "resign [himself] to [his] incurable pronunciations." The exploration of these musical routes as forking paths requires that some interaction and choice take place, so that together, if our paths should converge and regardless of incurable pronunciations, we shall read a few pages.

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## DISCUSSION

**Michael Ellison:** I think we have time for questions.

**Audience #1 (Cornelia Fales):** What keeps it from going on forever?

**Paula Matthusen:** Well, it could go on forever. Eventually we'll probably run into a successful ending. It depends on how much ... it could go on for days if we had food and beverages around and we just kept interrupting and interrupting, and the like. The shortest that we've done it in has been about three to five minutes, if we're going right on and it's really clear. It all depends ...

**Audience #2:** I'll give you a chance to make some sales commission. Why did you use that particular version of Max, and have you tried these ideas on any other programs? What is the interface you're using?

**PM:** I'm using a MIDI controller, made by Evolution, the UC33, and it's just simply for the fact—I try not to use the mouse, as much as possible, I actually use the [?] tablet as well, because it's just a bit faster sometimes. Just because of the fact that if I'm balancing all these channels, it's a lot faster to use, and in Max/MSP, I knew there were certain objects that would be very useful in terms of a compositional goal that I could work with. So that was why I chose to use it. I was just making sales commission.

**Audience:** [Laughter.]

**CF:** This is a question from a non-composer, so maybe you could make it a little more sophisticated than it is. Do you have sound files all made, and then what Kathryn does ... are the sound files made and then just enacted, or are sounds actually made from individual ... Do you see what I'm asking?

**PM:** We're trying for a balance, I think, between live processing and then having those moments when it's very clearly lined up. And so for some of those there are sound files that form the basis of the endings. And part of the process of this, too, is that for each ending there are two separate acoustical parts, and if there's one that we are approaching, in fact there is one that if we are approaching it, it is not our preferred one usually, so we'll just interrupt if we're heading in that direction.

**Audience #3 (Robert Reigle):** Sorry, I'm still not quite clear how the spectra direct the flow of the music. Would you be able to give a demonstration showing how some of it is played, and then what path results from that?

**PM:** All right, sure. So, the first thing, is if Kathryn plays something *ordinaire*, that gives me a very simple set of ratios. [Plays example of three individual notes.] So, based on what she did, which was very ... I got a very simple reading based on what she just did, meaning that her base frequency was 276, and that becomes 1. Then all the other frequencies above that, the partials, are very simple. So the bottom, the first frequency, becomes 1, and I'm just looking at the ratios, and then after that the next partials are 2, then 3, then 4, then 5, then 6, then 8. And that sort of indicates that I'm pretty close to a harmonic spectrum. And so, then we'll further exaggerate on that harmonic reading by staying as the terminology goes, *ordinaire*, pretty much. So, I take those ratios and then give Kathryn back this set of processed samples. [Example.] And I've been trying to figure out the simplest sort of cues, essentially, so that everything would be very clear in terms of not being confused on what the different paths were. So if it begins *prepared*. [Example.] Okay. So, this time, the ratios that I got were 1, 2.64, 3.72, 5.53, 7.96. So, because the majority of them are decimals, it sort of points in a way that it's probably largely inharmonic. Then I would basically signal to her [that] the very basic division that I would use, is using pitch tones. [Example.] And these basically translate into different playback speed ratios. Right now, if this were a very harmonic reading, it basically sounds like this: [Example continues].

But we don't really ... which is sort of why we had the harmonic ones be percussive. And then the inharmonic ones be pitched, because then the chords you get are a little bit more of a wild card in terms of the pitch ratios that come back. And then, if I lead based on what she [did] it's very clear



whether she goes in our score to either the *ordinaire* path or the *prepared* path. And then at that point she knows what I'm looking for in each case too, so she can sort of manipulate what's going on to steer things down particular paths, or she stays in the middle of the road and I take an interpretative route. And so, if she plays really loud, basically then I get ... in the next section it's basically looking at how many frequencies or how many partials I'm getting. So, if I get very few I'd get something sounding like this: [Example]. And there's not very many rhythmic voices going on there so she knows that we would go to PP. If I got a lot, however, it would sound more like this: [Example.] It's a pretty stark contrast, so she knows at that point which route to go down. And then there's more successive phases, which the next step that we look at is register, whether she's kind of high or low, and then after that, tempo. And then, it's at the point that we know what all those four things are, we know what path essentially we're heading towards at that point, the final, so there are no more branches. Is that clear?

**RR:** Yes.

**A#2:** I have two questions. One is, you mentioned earlier about if you realize you're going towards an ending that's undesirable, you can interrupt.

**PM:** Yes.

**A#2:** How do you know, unless you've memorized all the endings, how do you know that the ending that you're heading towards is undesirable?

**PM:** Well, you see on your score there are these little boxes, and finally when you get to them all, essentially we get to "Prepared piano goes low." These tabs here are the paths, and these tabs over here are the endings. So, it says, "If this cue enters, then go to 3B." At that point, we know ...

**A#2:** But you have to turn the page, and go there.

**PM:** Well, we know what they are.

**A#2:** Oh, so you do have them sort of memorized.

**PM:** Yes. But there's still room for surprises. It's very tricky to memorize "PP L F is 2B," or something like that.

**A#2:** And so there's a sense that it may not be [?].

**PM:** Right. And so, there's still a sense of exploration going on.

**A#2:** The second question that I have, is the piece itself, the structure that you have, is it evolving?

**PM:** Do you mean, at the time, or just ...?

**A#2:** I mean, six months from now, the way you do the piece, might there be more tabs and more bifurcations and stuff, or is this it?

**PM:** Well, my hope is that ... right now, it's basically arborescent shaped, very tree-like, and I would like it to be much more web-like in the future. And part of that, too, ... Right now, all the endings are a little bit too ... Part

of what is interesting to me about it is, if you turn to something and you get to an ending and say, “Wow, okay, let’s try this.” Right now, a lot of the endings are a little bit too ...

**A#2:** A little bit too what?

**PM:** A little bit too set. So, right now, the endings that we feel are good to use, we prepare and have sort of an arsenal, essentially. And if in the process of becoming I think more web-like, in having many more tabs and many more avenues that you can go through, that part will probably actually have to become much simpler, just less specific.

**A#2:** Can I ask a third question?

**PM:** Please.

**A#2:** I notice that you’re using an analog artifact—your book in your hand, with the tabs. Which kind of locks you into a two-dimensional, tabby kind of world. Could you hyper-tab that and make it a piece of software document?

**PM:** Yes, that would be fabulous. It wasn’t quite feasible to have it ready for this particular performance.

**A#2:** Have you been thinking about that?

**PM:** Yes. But it is a little bit cumbersome, but having something hyper-textual would be nice.

**RR:** I have a question about the piano. It looked like there were some bowed moments. Can you talk about the mechanics of that, and is that something that was notated or improvised?

**PM:** Well, all the preparations are there for her to improvise with, and then they’re called upon in specific endings, and in that particular instance, the bows were already in place in specified moments in the score.

**RR:** And how is it actually done?

**PM:** They are horsehair and tied together, and they’re already rosined so that they can grab the string, and she dampens the piano with the pedal and then bows. [Example.]

**RR:** So you got the horsehair from a bow?

**PM:** I play viola actually, and I have a pretty shoddy bow right now ... my bad bow—my good bow’s still intact.

**CF:** This is an opened-ended question, but do you have a sense of the relationship between your composition and what improvisation might be like between two normal performers with acoustic instruments?

**PM:** One of the ideas that I’m really interested in is that there’s kind of a fitness function going on in music—“Okay we’re all doing this, no wait a second, we’re going some place that’s not good, so let’s interrupt it,” or “Let’s find a way to go away from that as a group.” Just in terms of the self-

organization that goes on in improvisatory ensembles. The trick with this, and the reason it was originally going to be very loosely based on [?], that became difficult to deal with, and with just the two of us it became much more of a back and forth. And so, once you get into larger groups of people it becomes very interesting, and much less predictable.

Are there any more questions? Okay, thank you so much for coming!

## TECHNIQUES AND STRUCTURES IN PIANO IMPROVISATION

Matthew Goodheart

### A FEW CONTEMPORARY PIANO TECHNIQUES

In the interest of expanding the sonic possibilities of the piano, a common technique in contemporary improvised piano music is to use the body of the instrument, the frame, strings, soundboard, etc., in addition to the traditional way of playing the keys. There is no standardization of these techniques; in fact there is so much variation that it is one of the most compelling expressions of an improviser's individuality.<sup>127</sup> That is not to say that performers do not exploit similar techniques, or even borrow from each other, but I have always found that each player's approach is highly individualistic.

Working inside the piano tends to involve two interrelated categories of technique. The first is the "prepared piano," which usually refers to the placing of various objects, such as nuts, bolts, felt, etc., between the strings to create a variety of percussive and timbral effects when the key is struck. This technique was developed extensively by John Cage in the 1940s.<sup>128</sup>

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<sup>127</sup> One well-documented example of this comes from pianist and composer Denman Maroney, who has published his own set of techniques, which he calls "hyperpiano," on his web site.

<sup>128</sup> There were certainly precedents to Cage; from the harpsichord lute stop, to the variety of pianos built in the 19<sup>th</sup> century with "attachments" to lower wood, paper, or strips of brass onto the strings; strike a set of bells built into the instrument; and even a "drum" (a mallet which struck the sounding board). The bells and "drum" were often incorporated into a single stop called the "Janissary," used to play "Turkish" marches, and perhaps most famously Mozart's *Rondo alla turca*. Some musicologists believed that it was popular in Mozart's time, prior to the "Janissary" stop, to place a strip of paper on the piano in imitation of the sound of Ottoman military bands. Eric Satie and Maurice Delage also wrote music that called for the placing of paper or cardboard on the strings. In 1920s Paris, there was a brief popularity of the "luthéal," a modified grand piano with a series of metal bolts and

The key element here is that a “preparation” requires something set beforehand (though in truth, the preparation can be inserted or removed during the course of the piece), which is then fixed to make a particular sound.

The second category would be the use of non-traditional performance techniques that do not involve a “fixed” preparation. The term “string piano” was coined by Henry Cowell in the early 20<sup>th</sup> century to refer to the plucking, dampening, scraping, or other means of exciting the piano strings. Modern techniques, however, extend far beyond the use of merely strings to generate sound; pianists, including myself, have used the harp frame, sounding board, body, lid, keyboard surfaces, and even the underside of the piano; in short, anything that can possibly produce sound. For this reason, I simply refer to all of the above possibilities as “extended techniques,” since they rely upon performative actions by the player, rather than a previous preparation.

In truth, of course, these categories are not absolute, and really represent ends of a spectrum rather than some absolute division. My own interest is in fluid and manipulatable sounds which can be layered against each other, so my works run almost exclusively to the “extended technique” side of the spectrum.

Among the techniques used in the recording included in this publication, in the order of their first or clearest appearance:

- 1) A Tibetan prayer bowl, which is placed upside-down on the mid-range strings and slowly rotated, eliciting high harmonics. The quality of the harmonics varies tremendously, depending upon how much rust is present on the strings (the more rust the better!) and even the humidity of the room. **[CD 1:16 at beginning]**
- 2) A crotale placed on the lower strings and gently turned or moved across the strings, which provides a “dirtier” version of the Tibetan bowl, or a low metallic rumble. The sounds produced vary for the same reasons as with the prayer bowl. **[at 0:50]**
- 3) The use of the flesh of the finger, the fingernails, and the crotale to “scrape” the lower copper-wound strings. **[at 3:10]**
- 4) Clanging the crotale and prayer bowl against and within an old school bell placed on the mid-range strings. The school bell is allowed to rock freely upon the strings. **[at 03:23]**




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felt dampers that could be brought in contact with the strings to create a variety of timbres. Ravel’s *Tzigane* (1924) and *L’Enfant et les sortilèges* (1920–25) specified the luthéal. There are numerous other examples of these kinds of modifications.

- 5) The quick tremolo of the crotale against the upper strings. Percussive thumps against the metal harp frame are also used in this section. **[at 03:32]**
- 6) String harmonics, where one hand strikes the key while the other touches the string on a harmonic node. **[at 04:50]**
- 7) The prayer bowl placed right side up, with a finger holding it down when struck to amplify and limit its rocking against the strings. The school bell, face-up on the strings, is struck as well: left to its own devices, this bell will rock for several minutes, creating a wonderfully complex phasing sound. **[at 08:25]**

## TIMBRE-BASED STRUCTURE IN PIANO IMPROVISATION

The works played in my concert, of which the example included here is an excerpt, are an interrelated collection of pieces. There is not necessarily a narrative thread running through them, but in a way, it is a “suite.” They are related in the way a collection of paintings in an exhibit might be related, a non-linear series of works based around a central conception.

These works are improvised. While improvised music is sometimes considered a “genre” in itself, I really think of it as a technique or approach. There are many different ways to improvisation, from working over a harmonic and rhythmic structure like in traditional jazz, or forms of free improvisation where the players try to move quickly between ideas in a kind of stream of consciousness—not to mention improvisation in Indian music, Turkish music, and so forth. I think of myself as a “developmental improviser,” that is, focusing each improvisation to just a few ideas and working them in many of the ways a composer might. Sometimes the ideas are pre-determined, and sometimes they arise spontaneously. I consider the work structured, although the structure might not be linear, and might change based on what happens in the course of the improvisation. In some sense, spontaneous composition might be a better description of what I’m doing.

The focus of each piece in this suite is a technique or set of techniques. I have been developing a group of technical approaches to the piano over the last 18 months or so: ways of manipulating the damper; getting particular overtones off a string; resonances resulting from an attack; and so forth. Each technique, therefore, generates a specific set of timbral possibilities, and the improvisation is the exploration of those possibilities. In short, the sound itself provides the structure of the piece, and the development is the manipulation of different aspects of the timbre.

Improvisation is an important aspect of these works, and not just because I come from a jazz background. A basic tenet of improvisation is adaptation and mutability to the particulars of the given performance situation. Room acoustics are a good example; the resonance and decay of a room affect the clarity of the sound. A very “wet” room with a long decay is not always conducive to dense free-jazz type music, while a drier room works very well. So a good improviser “plays the room” by constructing the music to fit the environment. All musicians do this to some degree, but I think improvised music exploits this to a greater degree than most.

The differences between performance situations are even more problematic when it comes to pianos. Pianos vary tremendously in their construction. Therefore, these techniques, which exploit resonance, overtones, playing inside the piano, and so forth, have different effects on different instruments. Since the sound itself forms the basis of the improvisation, the idea is that each piece will be uniquely adapted to the performance situation.

This set of pieces, then, is really a vehicle for creating music that brings us into contact with what is in front of us at this moment, right now, with this instrument, in this space.

## DISCUSSION

**Audience #1:** You don’t have any biography in the Conference booklet?<sup>129</sup>

**Matthew Goodheart:** I don’t have any bio. I was actually ... I am a test-tube baby and I was just created for this event... [Audience laughter]. I am from San Francisco and have been on tour in Europe since September. I have both jazz and classical training and I have a master’s in music composition from Mills College, which is known for its experimental music department. I sort of came up through the ranks in free jazz, the West Coast free jazz contingent, a stream of the Cecil Taylor school, centered around the saxophonist Glenn Spearman. I worked with Cecil at the San Francisco Jazz Festival and wrote my thesis on the experience. While I loved that music, and still do, I eventually departed from there and started exploring other kinds of contemporary music: Pauline Oliveros, Morton Feldman, György Ligeti, and so forth. When asked to label the kind of music I do, I never know what to say. I feel a kinship to all that music, but don’t feel I’m in a

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<sup>129</sup> [MG agreed to participate in the Conference after the booklet had been finalized.]

single tradition. I'm not unique in that way, though. Many of the artists I work with feel the same.

**A#1:** Do you have more samples that we can find from the internet or ...?

**MG:** I have about five CDs out; one solo and several groups. The earlier ones are more sort of free jazz, the later are more like "new music," whatever that means. And there's a new disc from my group Zen Widow, with the Italian saxophonist Gianni Gebbia. I don't know if you heard of him, but if you haven't you should check him out. Garth Powell, a percussionist from California, plays with us, and we do some things like this in that recording. It was supposed to be out by now, too, but there have been the inevitable delays. The solo stuff I played for you now is new; I have been working on it only in about the last year and a half or so, so none of my recordings sound like this. I did a recording of them before I left, but I'm not sure what I'll do with them. Things are changing so much with distribution and the internet; I may put this up for digital download. Part of the problem, though, is that MP3 files use a lot of compression, and this kind of music really needs as high a resolution of sound as possible—otherwise you kind of lose the overtones in all these things. But it's an imperfect world—CDs aren't the best resolution either. Super-Audio CDs would probably be the best for subtle timbre-oriented music, but they are really expensive to do, and no one has Super-Audio players anyway. It's always a compromise. So I'll probably do the next couple of albums digitally and see what happens from there. There are some sound files up at my site at [matthewgoodheart.com](http://matthewgoodheart.com) and I hope to add more soon. Thank you.



## SURREAL DAYS IN ISTANBUL

Matthew Goodheart

Ciao All,

I'm at the Istanbul International Spectral Music Conference, at the Center for Advanced Research in Music at Istanbul Technical University. It's a bunch of papers, presentations, and performances. I was going to try to write an official summary, as I thought some readers might be interested, but the day's events seem to have overwhelmed things.<sup>130</sup>

So this is more of a personal thing, but I somehow felt like sending it anyway—just a brief summary of events up to today. Tuesday included a workshop and performance by the Alter Ego ensemble, of Salvatore Sciarrino's works—beautifully played. Also a concert of “Three Views of Turkish Music,” including traditional Black Sea music, Ottoman classical music, a new composition for electronics and Turkish instruments, and new compositions for traditional and Western instruments by Turkish composers. Yesterday included a workshop by Michel Galante and the Argento Ensemble, concerning Tristan Murail's *Ethers*; a concert of minimalism and spectralism crossovers; I played in the early evening; then a concert of Murail's *Ethers*, a new piece, and legendary Turkish vocalist Kâni Karaca. It has all been amazing, really.

But today was something else. The nine a.m. session (fortunately adjacent to the campus hotel where we are all staying) began with several papers: Stravinsky as a precursor to Spectralism, a talk about the psychological dangers of artistic creation (we are all nuts, you know), and a paper by a guy who wrote a spectral piece for high-school students. Then someone reading someone else's paper about James Tenney and the unrecognized American spectral school (which I guess I'm included in, since I was invited to play. Who knew?)

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<sup>130</sup> [This postlude is adapted from a posting made to the (San Francisco) Bay Area Improvisers Network discussion group on November 23, 2003, the third day of the conference.]

Then we had a break while Iancu Dumitrescu and Ana-Maria Avram set up to discuss their music, and walked outside just in time to hear the truck bomb explode at the British Consulate in Beyoğlu. Cell phones began ringing. The staff turned on the TV—we watched, but it was all in Turkish—what could I know? How many bombs? Two? Four? Televised images of mangled bodies on the street, twisted car frames. Hysterical people, frightened people—I’m one of them. The conference organizers huddled—okay, so the rest of the day should be cancelled, don’t go anywhere, stay away from crowded areas. But Dumitrescu is all set up, so anyone who wants to can stay for the presentation. So, take a breath, look at the TV for another minute, look sympathetically at the faces of the staff, feel like an idiot, then go into the concert hall.

Their music is wonderful, and amazingly close to the timbral improvisations we are all so familiar with. Of course, Dumitrescu came to this music through a radically different route. So we sat and listened to his viola piece—delicate overtone resonances quietly squeak out while through the windows the constant sound of police sirens. A solo bass piece from 1980 remarkably reminiscent of Peter Kowald: powerful, longing, the E string detuned in the last half, *sul ponticello*, loosely thudding against the fingerboard, deep wood sounds mix with the beating of chopper blades overhead.

Dumitrescu and Avram talk excitedly about their composition techniques, revealing their raw enthusiasm for timbral exploration. Another viola piece: slow transformations of sound, one would swear it was improvisational. Yet Dumitrescu asked him [Ion-Marius Lăcraru] to play the first minute again, to show that each sound was truly minutely composed. Did this matter? But yes, it was the same as before; and yes, it was just as beautiful. Then we were out of time, and the director of the conference said, “Okay, there’ve been four explosions of car bombs, a lot of people have died; the conference is over for today. Some people are expecting martial law to be declared. Stay here at the hotel, and don’t go to any crowded areas.”

So to the internet to email my parents that I’m fine, and then lunch with an interesting Turkish composer named Tolga Tüzün. We bump into the Argento Ensemble, they’re going ahead with the recording today, of Murail’s *Ethers*. We walk with them. Tristan lurks in the back of the studio. And wave at the ensemble through the studio window, and we leave. As we walk to the *pide* restaurant, Tolga and I talk about how the people look on the street, how there is a feeling of unreality. It really is sort of like 9/11. But the most terrifying thing, in a way, is that this is now a familiar feeling. It’s not new anymore—we all know that feeling of being jumpy, wary. That

immense tragedy is not far away in space or time. We ate for a bit. Martial law? Will the military step in and take over the government again? Istanbul, terrorism, the PKK. Then gradually music re-emerged. How is the tour? What are you working on now? The best quote from a young jazz musician about Tolga's work: "Yeah, I should get into some of that freaky shit."

Back to the conference hall, check Google News—no, it was just two bombs. Still tragic beyond compare. The second double bombing in five days. People milling about, what the hell—since we're all here and no one knows what to do, let's just go ahead and do the Dumitrescu workshop. So in we go—first a piece for viola, electronics, and bowed cymbals; loud, dark, serious. Then a conducted, semi-improvised piece for the Hyperion Ensemble. Especially this piece, so similar to some of the ensemble pieces in the Bay Area, but definitely with Dumitrescu and Avram's stamp. Really fascinating. He talks about living the music, the death of music written for the page, the need for contact, for listening. He speaks with a thick Romanian accent, and keeps forgetting to face the audience when talking, so this is really mostly from inference.

The workshop is over, we walk to the lobby; no one really knows what to do. Dumitrescu emerges with three huge boxes, two of which are filled with CDs. He just starts handing them out to people—not selling them, just giving them to us. I ask him about the similarity of his music to some improvised music, has he been to California? "California? Yes! They like my music in California." What about Mills College? "Mills is very good. They do important work there!" He opens the third box, which is filled with copies of his book. He starts handing them out to everyone standing around, signing them for whoever wants it. He just keeps giving people things.

Then we go to our rooms. I can't get the BBC on the set in my room—so it's off to the library for Google News. 27 dead they say now, no martial law. Yet. Death, death, death. I can hear in the practice rooms someone working on a Grisey piece. Or is it Murail? Clusters of piano notes, deformed, a mutation of pitch over time. Concentrated, detailed; one finger held down sustains a tone, another reaches around it, working to find that gentle stroke which will elicit some startling resonance. That's how it is for me; a struggle, minute gestures move themselves into the instrument; the action of the key, the excitation of the string, the placement of the damper; then into the air, waves of energy moving against each other, outward; inward, to the basilar membrane, into our bodies. It is this body, this instrument, this air, this time, these people.

So this is what the 21<sup>st</sup> century is like.

Kinan, a clarinet player from Syria, sees me and comes over. He says we should go drink some *rakı*.  
Yes.

-mg

## INTERVIEW WITH ANA-MARIA AVRAM

John Bolender, 22 November 2007

**John Bolender:** Tonight on *New Classics*, we have a guest, Ana-Maria Avram, a prominent Romanian composer who is in Istanbul today, the 22<sup>nd</sup> of November 2003, for the Istanbul Spectral Music Conference. Welcome to Turkey.<sup>131</sup>

**Ana-Maria Avram:** Thank you.

**JB:** I hope you are enjoying Istanbul.

**AMA:** We are enjoying it very much. It's a marvelous, magic town.

**JB:** I agree with that, especially this morning with all the fog over the town, it was very magical. I want to begin with the most obvious question. In simple, layman's terms, could you say what spectral music is?

**AMA:** It's a music that for the first time in European culture, after centuries, has something to do with and respects the sounds. It respects the sounds as being alive—real being, not something you can only put on the five lines of a stave, and combine in any way; it's not a combinatory music. We have to refer about the structure of spectral music. It's a music that emphasizes timbre, but it's not only the timbre. Spectral music refers to the sound, like a continuous whole where there is no hierarchy of the parameters of the sound: the pitch, rhythm, timbre, and intensity.

**JB:** Just for our listeners, I want to clarify that timbre commonsensically is what makes different instruments sound different. A clarinet, a flute, and a piano sound different because they have different timbre.

**AMA:** Because they have different formants in parts of their spectra, and that's why we're referring to spectra, and to spectrum.

**JB:** Earlier today in the conference, there was some reference to timbre not being basic; timbre is reducible to other elements in music. Could you say something about that?

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<sup>131</sup> [These interviews were broadcasted on John Bolender's weekly radio program about new music, at Middle East Technical University, Ankara.]

**AMA:** Well, I don't agree totally with that. First of all, timbre makes the unity of the sound. As I say, there is a unique, a particular sound we are working with. A sound alive, and not a theoretical approach to the sound, but a practical, a very concrete one. It's about the concreteness of the sound. The concreteness of the sound is also the pitch, the rhythm, the other parameters, and the timbre, together.

**JB:** Could one say that psychologically timbre is real and not reducible, but physically, acoustically, maybe it is real?

**AMA:** Especially acoustically, it's not reducible.

**JB:** It's not reducible?

**AMA:** Exactly.

**JB:** So it is something basic.

**AMA:** Maybe it's not perceived like that by all the Western culture, which rejected its importance for many, many centuries. Which importance came to be a little bit alive with Debussy's music, and flourished later with these schools of spectral music, which are in fact completely parallel, the French school and the Romanian school are even synchronized. They are completely parallel one to another. There was similar research. There were connections, but without any tribute one to another.

**JB:** Speaking of the importance of timbre to spectral music, you mentioned Debussy. It seems that timbre is especially important in a lot of French music.

**AMA:** Of course.

**JB:** Is that why spectral music is so often associated with France?

**AMA:** Probably, yes. It's not by mistake that this happened in France—that one of the schools was in France, because there are many references to timbre and to color. It's a little bit—not only coloristic ... it's illustrative. There is something illustrative, it's something that is added to something; it's not the very essence of the music, even in Debussy's music. Timbre became more important, but it's still not as important as to make the structure of the music. The problem of the spectral school is to find in timbre—but not only in timbre—the possibility of advance and of the construction of an entire music.

**JB:** Construction of an entire music, including rhythm?

**AMA:** Including rhythm, yes.

**JB:** So there's an approach to rhythm in spectral music—it's not just timbre?

**AMA:** It should be. When we refer to spectrality as an absolute, there are internal rhythms in spectral music, in spectra, in the combination of spectra, which are completely internal and completely objective, which are the

rhythms of the sound matter itself. It's not the only rhythm we are using in music that uses spectra.

**JB:** Could you say something about the equally tempered scale?

**AMA:** Yes, just a moment. There is something more that I want to say, which is very important. It's the fact that the rhythm became transformational; perpetual transformation is the most important thing in spectral music. The timbre is modulating itself permanently; it's a transformational music, or it should be. The essence of the real spectral music should be a kind of an advancement in perpetual transformation, and that makes a discontinuous rift with the traditional Western musical culture.

**JB:** I see. To go back to the question I was asking, could you say something about what the classic chromatic scale is, the equally tempered scale, and why that's not compatible with spectral music.

**AMA:** The classic tempered scale, in fact, is a utopia. It's a utopia that we practiced for many, many years.

**Iancu Dumitrescu:** Only for piano. Excuse me.

**AMA:** It became a reality. With the piano, certainly, with the *clavicembalo* [harpsichord]. But it's not a sonorous reality, because even a string of a piano is finally a non-tempered instrument—one string. The strings, one referring to another, are tuned in a very unnatural way, which is not the way of the natural resonance, but it's quite like it should be.

**JB:** Very nearly.

**AMA:** Very nearly, but not enough. It's more exact, but it's not the truth. It's the difference between truthfulness and exactitude. It may be exact and you can do modulations in a very simple way, enharmonic modulations, which are a specificity of the tempered music. The problem is, only the piano is a tempered instrument. In fact, even today they are referring to a tempered ear, or training in a tempered way, the instruments like the strings, and especially the winds have a special construction and could not be tempered instruments because they are constructed differently. They don't suppose a space that is tempered.

**ID:** All is false in this conception. Because only the piano, only the organ, only electronic music is equal, the sound is perfectly equal.

**AMA:** It's tempered.

**ID:** In other music, there is a very great difference between a flat and a sharp.

**AMA:** Instruments are discontinuous.

**JB:** So when people sing, they probably are not singing in an equally tempered scale. It's impossible.

**AMA:** No, they can't. It seems that, for example, a very young child, if he begins to sing at a very early age, he will instinctively use the non-tempered scale, of the natural resonance. I observed that, and it's true. That means that the natural resonance—in our archetypal being, it's something like an unconscious, cultural, and spiritual archetype.

**JB:** Or maybe even sub-cultural, if there are very small children doing it.

**AMA:** Of course.

**JB:** That reminds me of something I was going to ask. In this conference, there's been a lot of talk about the nature of sound, but there's not been much talk about music cognition, how the brain processes music. I'm wondering: is that an area that composers are beginning to explore? Is that part of spectral music, or is that maybe something else?

**AMA:** How the music can be recognized and thought?

**JB:** How the brain processes music. How much musical material one can remember over a short period of time, how many subtle differences one is able to notice. Because it seems like we become so absorbed in this sound world, and we sometimes refer to culture, which is fine, but we forget that there is something on the other end processing the sound. Maybe there are some subtle differences that one can't always pick up.

**AMA:** The problem is that spectral music should be music that is non-figurative; I'm sure about that. References to the quality of the sound help us to distance us from the figurations, and from the melodies.

**JB:** What do you mean by figurative?

**AMA:** Figurative in music is—for example, if you have melodies, they could be figuration. What is not figuration in Wagner's music could be figuration today—what could be accepted as figuration today. Melodies ... are for me impossible to think about. I reject completely this genre of music, neo-Romantic music. In an interview that I had with Harry Halbreich, who is a great musicologist, and one of the very few who really knows something about spectral music, I said that I reject also the neo-Romantic and the retro-music because I don't like to have a bath in the water where somebody else washed himself before.

**JB:** That's a nice way of putting it [laughs]. Could you say something briefly about the connection between spectral music and ethnomusicology?

**AMA:** Yes. I discovered very early in my studies at the conservatory, when I studied also a little bit of ethnomusicology, it was part of our curriculum, that there are two manners in the folk music, in the traditional music, of being near or using the spectrum. One of them is by the use of instruments that are really playing spectral music, which use natural harmonics, which are a kind of alphorn. Also, string instruments. The sitar, for example, is an



instrument that has an extraordinary richness of harmonics that are very revealing and very clear for the ear. Of course, it has something to do with the construction of the instruments. We have in Romania these kinds of instruments. There are also scales that we use, scales of modes extracted from the spectrum [sings eight-note, ascending major scale]. All is reduced in an interval of an octave, and this is not spectral music. This difference, we can also make now between some ideas of spectral music, which in fact are not spectral music, because they don't use spectrum, don't use partial sounds, don't use multiphonic sounds, which are an agglomerate, a chord, but is not in fact a chord, it is completely another reality for the wind instruments, which is a very important ...

**ID:** Noise.

**AMA:** Noise, they don't use also this relationship between musical sound and noise, which is also very important.

**ID:** Because noise is in the spectra. It is produced by very small differences between the very high harmonic components.

**AMA:** Then we have this possibility of contrasting in spectral music, which is a specificity of this music, and which has not to play in other kinds of contemporary music, the difference between noise and sound, harmonic sound and inharmonic sound, dirty sound and pure sound. Not really those exceptions like black and white. But it's the possibility of contrast and of development.

**JB:** Thank you very much. I'm afraid that's all we have time for right now. Thank you very much for the interview. I hope that you have been enjoying Istanbul and Turkey despite the recent unfortunate events.

**AMA:** Yes.

**JB:** I want to thank my guest Ana-Maria Avram, for the gift of her time, knowledge, and wisdom.

**AMA:** Thank you.

## INTERVIEWS WITH IANCU DUMITRESCU

John Bolender, Robert Reigle, 22 November 2003

### FIRST PROGRAM

**John Bolender:** Tonight we have a guest, Iancu Dumitrescu, who is here in Istanbul for the Istanbul Spectral Music Conference, the third week of November. Mr. Dumitrescu is an important Romanian composer, and uses spectral techniques in composing music. I suppose that the first question I should ask is “What is spectral music?” and alternatively “What is a spectral approach to a sound?”

**Iancu Dumitrescu:** For me it is very complicated to explain because I have very long experience in this kind of music. And it is very complicated also because my thinking has many aspects, many problems, and many kinds of different and perhaps contradictory aspects. It is not so easy for me, but I can answer that my music is a special kind of spectralism. It is a natural spectralism, it is not so artificial, because in European culture you have music for paper, for example—music for seeing, not only music for hearing. It is a very spectacular evolution in Western Europe, this kind of music for paper: very interesting; very complicated; with many, many, and very difficult rhythms; with many details; with many and complicated processes. But finally the result is not so great, because finally music is only for hearing. And maybe it is a moment to finish with this kind of music because this intellectual adventure was maybe a fiasco; a divorce from the public was the beginning of this general crisis of the musical culture, of the actual music. I wish to rewrite my idea, to rewrite my thinking, to reorganize my thinking, to re-read all the texts of contemporary music for understanding where is the bad after me, evidently; where is the bad beginning, where is the bad evolution of these very intellectual ideas, and where is the new possibility to open a new evolution in the music. It is unacceptable for many of us not to try to produce another aesthetic point of view, or another evolution of the music. And for this I can declare simply, I am a spectralist

but in the same time I am not spectralist. I am perhaps among the first five composers with this intuition of a new world, but in the same time, I departed from this very closed group for another discovery. Each period in my life I wanted to discover the freedom, to discover a new mind, to discover other aspects for being free, for being—if you wish—current, for entering a dialog with others. Because for me music is substance, it is a material for a dialog, not for my personal satisfaction, but to give others satisfaction, and to discover my necessity, my subjective necessity, is another reason; for this I write music, for this I produce electronic music. My first period was not so interesting because it was a prolongation of the dodecaphonic thinking of that era.

**JB:** Extension, maybe, it was an extension of that.

**ID:** Yes, extension. But after five or seven years I discovered the necessity to transform these first ideas in another world, and I discovered the possibility to make music with only one sound, with more sound but for each instrument with the same sound. For example, a flute plays one sound, the second flute plays another sound, the bassoon plays another sound. All pieces had dialog between instruments, with many aspects of harmonics, and also because it was necessary to play each sound 20 minutes; it was very complicated. Each sound was a personal adventure for the players. But for a large orchestra—*Apogeu*m, for example, I do not know if you know this piece. It is a great cluster but it has more details, with more difference of dynamics. After this, I transformed step by step my thinking and my practice, and I discovered the world of the spectral sound.

**JB:** Right there, could you just say what spectral means in music; we are talking about overtones, I believe.

**ID:** Overtones, yes, you are a great expert. Because the other aspect, the traditional aspect, we can say Mozart, is also spectral because the first harmonics of one tonality is the octave. Because spectral music, the spectral idea, is not only a very interesting theory, it is also a practice, a composition. It is not good to compromise these new ideas. We can have many ideas each hour, but if the reality of the music is not very impressive, not very original, the result is nothing. I cannot accept to be the composer of something not original. For this, in conclusion, evidently, I love very much this style, this concept of spectralism, but in the same time, I work for developing something original, something strong, something better, something unknown. If I compose spectral music like Debussy, for example, it's nonsense for me. In conclusion, I want to develop, I want to progress, I want to be each time more original, more advanced, more complex, more diversified. Because my problem is, for me my music is the same music,

each piece is the same music, but I want to force myself to discover another point, another interest, if you wish—like in classical music, to do another melody.

**JB:** Constantly expanding into new areas so you are not simply repeating something that's done before, because the potential, presumably, is infinite. Given this infinite potential, one does not just want to go back and try to do something that was already done, but try to look into some other area of the space of possibilities, just if I could throw up my own formulation of it. I am afraid though that that is all the time we have for today. But I want to thank you very much. Our guest today was Iancu Dumitrescu, here in Istanbul for the Spectral Music Conference. I hope you have been enjoying your stay in Turkey. Thank you.

**ID:** Thank you.

## SECOND PROGRAM

**John Bolender:** Tonight we have two guests. The important Romanian composer Iancu Dumitrescu, who is one of the first composers using spectral techniques and approaches to sound, and the composer Robert Reigle, who teaches at Istanbul Technical University in the music department. We are here today because there is an international spectral music conference in Istanbul this third week of November. I would just like to suggest the beginning question. Could you say something about the history of spectral music?

**Robert Reigle:** Thank you, John. Iancu, can you talk a little bit about the composers that were the ones that originated the idea of spectral music in the 1970s?

**Iancu Dumitrescu:** My position, my situation was very different in comparison with the others. In Romania of the 60s—I was a young composer and my professor was a very, very great composer, very important and very strongly engaged in modern contemporary music for Romania and perhaps also for Europeans. But after some years, I discovered this very simple idea that it is necessary to discover my way, my solution, because it was not so good, not so important for my life to work in the same direction.

**RR:** Who was your teacher?

**ID:** My teacher was Ștefan Niculescu, for example, a great composer and professor—Aurel Stroe, Anatol Vieru, it is a classical modern music in Romania like Ligeti for example, like Lutosławski, like Penderecki, the same generation. After this generation, I tried to understand what can be made, what can be acceptable for me, and I discovered this idea of the freedom in

the music, and the idea of an alternative to this very right music, very right and at the same time not so romantic, if you wish, not so modern music. And step by step I amplified my research, I discovered the importance to be a player also and I was a piano player, I played other instruments; after this I discovered the solution of conducting and it was the beginning of my ensemble, Hyperion. This Hyperion Ensemble was a laboratory of my thinking. In the same time, I contacted the great conductor Sergiu Celibidache, one of the first and very important thinkers in the conducting world. He explained to me many times, the perspective of phenomenological thinking to the music. Music is nothing, music is irrational; it is not possible to conserve the music. The score is not the music; the score is a paper. And so, many, many ideas very new to me at this moment, but it was a strong attack against my classical thinking and the beginning of the new perspective for me. And after years, I understand maybe very well the perspective and the importance of Sergiu Celibidache's thinking, and I developed a truthful, phenomenological composition—not interpretation, composition—and this is the fundament of my thinking [about] composition, to assume the acoustic, to assume all the conditions of the beginning of the music. The hall, the quality of the instruments, the quality of the players, the quality to exploit at maximum all these very, very important qualities of the material, of the sound. For this, I say music is not for paper, it is for a player, it is special for the quality of this player. It is a very different way to write music for all the flutists, or to write music only for one particular flutist. One who is able to view, to understand, to play in the whole, to play the true idea of inspiration, the truthful quality of a score. It's very not common.

**RR:** I think this is the great advantage of Hyperion Ensemble and the long period of time that you worked with this group. What year did you start the Hyperion Ensemble?

**ID:** I think it was 1968—but the name of Hyperion Ensemble, 1969-70.

**RR:** Are there any members still playing with Hyperion that are from the original time?

**ID:** I changed many, many persons because many musicians in Romania come from [go to?] Western Europe to try to live in France or in Germany. I can say that in this period I changed perhaps six times this entire ensemble.

**RR:** But I think your bass player, Ion Ghiță, has been with the group longer than any other player has. What year did he join the group?

**ID:** He was very young and very open to—and he loves me perhaps, I do not know, because it is a strange relationship in Hyperion. It is many, many people love the idea, another loves the atmosphere, another loves truthfulness, this adventure in the sound, but the result is important for me.

For this, it is another very complex idea of phenomenology. It is the sentiment of the players, the sentiment of the friendship, the truthful friendship, it is very important for open, for trying to open, and for results. It is not possible [for] one person to develop—it is not the time; it is not our time to be a genius, to assume all the aspects of the music. Perhaps the new music is group-produced, it is an intersection between more and more ideas. In the same time, I worked with other international great artists, for example it was a period of laboratory—a period of work with Fernando Grillo. He is a great bassist, he made in this time many, many concerts, demonstration concerts. The music was like a demonstration for young people, for composers. In this period, I contacted him in Holland and it was a strange contact between us. With him, I can develop with my very, very high ideas in this time, because he is also a composer. He is a great player. He has a great personality. He is also philosopher and intellectual, because among musicians this is not so common.

**RR:** So I think during this time your notation changed, you've developed a very unique type of notation. Can you describe how your notation started out, in the 1960s, and how it has changed until today?

**ID:** This was my constant program, my constant attention because it is so easy to have a small inspiration today. But to conserve this idea, it is perhaps a European idea to conserve, to have a library, to have books, because not only the memory, but for others; it is another aspect. And for preparing a future for each music I made many times to discover the possibility to write, to preserve the same techniques. But finally, I can declare that it is in the same time very important, but in the same time not truthfulness, because you need direct collaboration with the player, direct contact, direct working. You have an important idea but if it is only theoretical, nothing can understand; nothing can accept the difference. Each time it is very dangerous for the idea, each time it is another—the human body changes, the human thinking changes. All is life, is continuously changing, and music is continually changing. For this [reason] it is absolutely unacceptable for me to preserve the same prejudgment, the same idea. Also for me, also for my first composition, I change the idea, I change the solution. It is normal also for other composers, for example in 1986, I think, I was in Paris at a concert with Stockhausen, Stockhausen played *Kontra-Punkte* and other very classic music. It was **other** music for me in comparison with the first records made also by him.

**RR:** It changed. It became something different.

**ID:** Something different, another dimension. Very romantic, very expensive. The first recordings of the same piece were very not inspired.

**RR:** Cold.

**ID:** Yes, very, very cold. Incredibly cold. On the contrary, this concert was the splendid demonstration of the human, if I can say, qualities of poetry, of sentiments.<sup>132</sup>

**RR:** Suppose you have a recording of one of your pieces that you like very much. If we transcribe every detail of that performance, and then have musicians play again the exact frequencies and notes, is it possible to recreate that beautiful sound?

**ID:** It is very different; it is very different. I construct—for example, for the classical music with Celibidache, each concert has other tempo, other qualities, and other disqualities. This is viable for a very traditional music, for a very known music in conservatories. But for the new music, very current music, for my music for example, for the music of yesterday, for example, it is practically impossible. It is very different.

**RR:** Why is it impossible?

**ID:** It is impossible to conserve the same inspiration, because it is very inspired music, to do a step in advance, to do a step for the future. It is like inspiration, you are not inspired in each moment, yes? It is something exceptional for the moment, *hic et nunc* [here and now]. This is also phenomenological thinking. In this situation, you understand the very exceptional moment. It is a reason to remake, to continue the life. Only for this, for retaking, for re-obtaining many new possibilities, but it is impossible, I think, also. It is impossible to—like a *fata morgana* [mirage]. Each time you try to obtain, but this is very rare, it is very unknown, the moment. It is a splendor of the moment.

**RR:** Can you say what the source of that inspiration is?

**ID:** It may be also a technique. Each morning I try to question myself, “What can I do more? What can I do not yet produced, not yet thought?” It’s a technique. It’s a technique of precariousness. It’s a technique to not master. It’s a technique to be pure each time. It’s a technique to not fix the ideas, to not be precise, to be different, to prolong an experience, to discover as a—. It’s tragic. It’s a very dramatic situation of these composers, of this kind of thinking. It’s very dramatic.

**RR:** And then in the performance, are the musicians adding their inspiration with your inspiration, or how does that work?

**ID:** Yes, it’s a sum of all the inspiration. It’s like a mystical situation; it’s like an orphic position. It’s also technique. For example, you can contact one

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<sup>132</sup> [At this point, a short segment was not recorded, while the digital audio tape was being changed.]

player. You can have a good connection with one player. That is very important to have a good, truthful connection with a player. Because this can be a model for others. Even if the other is in bad condition, he is not open to—, finally he enters in the same situation. It's a transcending position, yes? For this, I speak all the time of the irrational situation of the music. It's not rational, the transcendence. It's something possible or impossible. We try to eliminate all the prejudices. We try to eliminate all the bad conditions, all the contradictions in everyone. In everyone it is, if you wish, a dialectic between an open and a closed situation. It's not simple; it's very, very difficult. For this, in the same time, it's very important to be very simple, to be modest. But in the same time, with very good direction, very good intention, to be clear in what you wish to obtain. But what you wish to obtain is unknown, finally, it's only an idea, only some ideas not yet practical in the situation, to be accepted by other players. It's dramatic, but I think it's a unique solution to open the musical world, and to break these terrible critics of the contemporary music. The music is not only for the initiated person, not only for the intellectuals, not only for very great specialists. It's also for others, for many people. It's not a communist idea. Perhaps for me it's a human condition. For what, music? For what, to make music? For example, for me, I am very—I am not content. Each time I was discontent about my realization, dissatisfied. Each time I was very dissatisfied. It was a very tragic life for me. But after that time I discovered the satisfaction of very small components. I discovered the importance to be dissatisfied. It's very important, it's a reason to continue.

**JB:** I think we have to stop now. I would like to thank our guests tonight, the composers Iancu Dumitrescu and Robert Reigle, who are here in Istanbul for the spectral music conference. Thank you very much for your time and your ideas.

**RR:** Thank you, John.

**ID:** Thank you.



## INTERVIEW WITH TAMARA RAATZ

John Bolender, 22 November 2003

**John Bolender:** Today we have a guest on *New Classics*, Tamara Raatz, Associate Professor of Clarinet at Eastern New Mexico University. We are conducting this interview at the Spectral Music Conference in Istanbul on the 22<sup>nd</sup> of November 2003. Earlier today, Professor Raatz gave a talk on the exploration of the timbre as a compositional device and the musical mechanics of mysticism from the *Quartet for the End of Time* by Olivier Messiaen. It was a very interesting talk about Messiaen and this particular piece of music, and I would like to begin by asking Dr. Raatz under what conditions did Messiaen compose the *Quartet for the End of Time*?

**Tamara Raatz:** Olivier Messiaen composed this work while he was imprisoned in a Nazi prison camp in Silesia and he composed the work for the instrumentalists he had at hand—clarinet, violin, cello, and himself at the piano. The premiere was in January 1941 in the bitter cold. He comments in his notes that the instruments were not in good repair, the keys on the piano wouldn't always come up, and there were only three strings on the cello. So, it was not the ideal of circumstances, but he describes looking back at all the performances that he encountered during his lifetime of this masterpiece and mentions the premiere performance as being the most important to him in his relationship with his work. To truly study this work is to see beyond the texture, beyond the notes, beyond the mechanics, really to understand the more important meaning behind the piece.

**JB:** You made an interesting comparison earlier about how this could, in some sense I suppose, be interpreted as a Holocaust piece. How different is it from other Holocaust pieces, let's say by Arnold Schoenberg, and other 20<sup>th</sup>-century composers? Could you say something about that?

**TR:** Unlike other composers who wrote pieces depicting war, depicting the horrors of the Nazis, his music is expressive of peace, hope, and tranquility amongst chaos, that in times of such strife, in times of apocalyptic type events, there's reflection. The apocalypse, as stated in the Bible, speaks of silence as an equally powerful effect on the spirit as fire and brimstone. And

I think that is the underlying power in his piece. Sometimes in the silence and in the static quality of the texture, the performer is able to connect with the listener in a more powerful way than if they were playing many, many notes at a *fortissimo* level.

**JB:** Well, speaking of silence, I have a paradoxical question: is there something in this music that relates to what goes beyond language, and can you say something about what cannot be said?

**TR:** I think that is a powerful statement, I find as a performer that it is in the silences that an artist enables the music to reverberate and connect spiritually with the audience. It is what is not said or not seen that sometimes carries the most impact for the observer or the audience member. In studying the opening lament of the third movement, the simplicity of the chant-like musical line is absent of filigree or ornamentation. The attention is placed on the simple statement in a narrow pitch range. The dynamics carry the clarinet melody from *pianissimo* to *fortissimo* using the color within the sound to create images.

**JB:** Could you say something about Messiaen's attitude towards nature, and maybe also something about birdsong?

**TR:** Yes, he studied birdcalls in the natural environment. In fact, he was an amateur ornithologist. In his book, *The Technique of My Musical Language*, he lists at least 50 pages of notated birdcalls. The *Quartet for the End of Time* was one of the first pieces that utilized notated birdcalls from the natural environment, in this case for the clarinet. It's the *merle*, specifically the blackbird, and he goes into great detail about how the blackbird comes about its call and how this specific bird develops the calls. Messiaen symbolically contrasts the opening lament to the joy of the bird. The two ideas are linked together. Young performers often see these two elements as opposites, but musically and spiritually they are interconnected, because in order to understand brilliance you must have the other.

**JB:** And I also think it's surprising that in some of his birdsong music when he imitates or quotes the song of the bird he will often use percussion instruments instead of whistling instruments. Well, you mentioned the clarinet, and that's not too surprising I suppose, but in many pieces it's often marimbas and mallet instruments that he's using for birdsong, instead of flutes or piccolos, or something like that. It's a little surprising. I wonder, do you have any thoughts on why he chose percussion timbres instead of wind instruments?

**TR:** Percussion instruments can create such a myriad of sounds, depending on what kind of stick and where the instrument is struck. One percussion instrument can create so many color possibilities. Many birdcalls have a lot

of point to the sound, a lot of initial point; it's not all about flutter. I think that in many ways, percussion instruments can more colorfully create that sound than, say, a flute. The first movement of the *Quartet for the End of Time* depicts daylight; the clarinet and violin imitate birds awakening at daylight, which is so beautiful. When you look at the score, you can't imagine how the music will work together because the parts are so very different from each other, but when you step back and listen to the movement as a complete entity, it's just an unbelievable connection to nature and to a higher spiritual plane.

**JB:** Could you say something about your first exposure to Messiaen's music?

**TR:** My first encounter with the music of Olivier Messiaen was in preparation for several performances at the Houston Holocaust Museum. As I began to intensely study the piece, I think what struck me was that I had a connection to the piece that was more powerful than the notation. The clarinet writing was unlike any I had ever performed before—the music resonated so strongly. It is still the most powerful piece of music that I've encountered on stage with an audience and with an ensemble. The clarinetist is tacit in the last movement. It's very hard to contain yourself emotionally because you're completely connected not only to the musical experience with your colleagues on the stage, but also bound emotionally with the audience. Every time I perform this piece, I am moved by the seven or ten second delay before the applause where people were altered for a moment. This is an impression that I haven't encountered performing other contemporary music. Messiaen's musical language is unique. When we talk about spectral concepts in music, audiences often think that this implies amplified or non-acoustic textures. The contemporary appeal of the tonal textures in Messiaen's work is a result of a traditional acoustic chamber ensemble. It's still in my mind the most innovative use of music texture.

**JB:** Professor Raatz, I want to thank you very much for your thoughts on the *Quartet for the End of Time* by Olivier Messiaen, and I hope you enjoy your stay in Istanbul.

**TR:** Thank you.

## CONTRIBUTOR BIOGRAPHIES

Chris ARRELL received his doctorate from Cornell University and is currently Director of Music Theory and Composition at Clayton State University in Morrow, Georgia, USA. His music has received numerous awards and recognitions including, among others, commissions from the Fromm Foundation and Music at the Anthology; honors from the American Society of Composers, Authors, and Publishers; and residencies from the MacDowell Colony and the Atlantic Center for the Arts.

Ana-Maria AVRAM, composer, pianist, and conductor, was born in Bucharest in 1961. She obtained degrees from the National Conservatory of Music in Bucharest and Paris Sorbonne. Since 1988, Avram has maintained a close collaboration with Iancu Dumitrescu, but she has also continued to forge her own direction in music. Her music is recorded on Edition Modern, Electrecord, Artgallery, and Radio France.

Tildy BAYAR is a doctoral student in the Critical Studies and Experimental Practices program at the University of California, San Diego. Her research interests center on the aesthetics of 20<sup>th</sup>-century music and music technologies, and on empirical investigations into alternative pedagogical strategies. She is a Csound composer, music reviewer, and co-editor of *The Open Space* magazine. She holds a master's degree in electro-acoustic music composition from Mills College.

Helen BLEDSOE, flutist, plays with musikFabrik, Cologne, and is assistant instructor at the Hochschule der Künste, Bremen. Winner of the Gaudeamus Prize for Interpreters, the Myrna Brown, and Banff Concerto Awards, she is active giving workshops and concerts throughout Europe. She graduated from Indiana University and the Amsterdam Conservatory, and studied Carnatic music in Bangalore.

John DACK was born in London in 1950. He studied music at Middlesex Polytechnic (BA Honors, 1980; PhD 1989), City University (post-graduate

DipMIT, 1992; MSc, 1994), Goldsmiths College (MMus Analysis/Theory, 1998), Middlesex University (MA Aesthetics, 2004). He is currently Senior Research Fellow at the Lansdown Centre for Electronic Arts, Middlesex University, London. His research interests include French and German electro-acoustic theories, music analysis, serialism, Romanticism, and Modernism.

Xavier DAYER (born 1972) studied composition with Eric Gaudibert, Tristan Murail, and Brian Ferneyhough. He won the Bürgi-Willert-Stiftung award, and the Foundation Edouard et Maurice Sandoz Prize. He has received many commissions, including a work for l'Opéra National de Paris, and a work for vocal octet, instrumental ensemble, and electronics, for IRCAM. He teaches composition and music theory at the High School of Arts of Bern. Editions Papillon publishes his music.

Mine DOĞANTAN-DACK is a professional pianist (The Juilliard School BM, MM) and a music theorist (Columbia University, PhD). She has published articles on the history of music theory, affective responses to music, expressive performance, and the relationships between performance and theory. Her book *Mathis Lussy: A Pioneer in Studies of Expressive Performance* was published in 2002 (Peter Lang AG). She is currently a Research Fellow at Middlesex University, London.

Nilgün DOĞRUSÖZ studied spectrographic analysis of Turkish vocal music in 2000 with Dr. Robert Cogan at New England Conservatory of Music (Boston, USA). In 2001, she was a visiting scholar giving lectures on Ottoman/Turkish music at the Center for Middle Eastern Studies of Harvard University. Currently she is an Associate Professor at the Turkish Music Conservatory at Istanbul Technical University. She teaches music paleography, history, and theory of Turkish music.

Iancu DUMITRESCU (born 1944) is one of the leading personalities of contemporary music, embracing both composition and interpretation, and is considered one of the most important contributors to the spectral music trend. He studied musical phenomenology and conducting with Sergiu Celibidache. His compositions are based on ultra-spectralism and acousmatics from a phenomenological point of view, in which sound is subject to analysis and dissociation, processes which confer a genuine force of suggestion and penetration. His publishers include Editions Salabert (Paris), Escargot-CBS (Paris), ReR Megacorp (London), and Gerig

Musikverlage (Köln). He has had works commissioned by Radio France, Art Zoyd, the Kronos Quartet, the French Ministry of Culture, Musiques Nouvelles, and the London Sinfonietta.

Michael ELLISON's compositions have been performed by the Borromeo Quartet, the New York Youth Symphony, Helen Bledsoe, Vivica Genaux, the Pittsburgh New Music Ensemble, the Berlin Saxophone Quartet, Kâni Karaca, and Erkan Oğur. He has received commissions and awards for his music from the Beebe Foundation, Ojai Festival, Barlow Endowment, Copland House, ASCAP, Fulbright, NEA, and the American Research Institute in Turkey. He teaches at MIAM, Istanbul Technical University.

Cornelia FALES received her doctorate in ethnomusicology from Indiana University in 1993. She did postdoctoral research under Stephen McAdams in the division of Perception et cognition musicales at IRCAM, on noise as a timbral feature of music. Her field research has focused on the music of Rwanda and Burundi, as well as on popular electronic music of the early 1990s, and she has published in major ethnomusicology and perception journals. She has served on the faculties of the University of California at Irvine and Santa Barbara, and is currently at Indiana University. At present, she is at work on a history of timbre-awareness in Western music.

Joshua FINEBERG received his BM from the Peabody Conservatory, and DMA in composition from Columbia University. Previously, he worked in France as a composer, pedagogue, scientific collaborator at IRCAM, and artistic director for recordings. Editions Max Eschig, and Gérard Billaudot Editeur publish his compositions. Fineberg is the USA Editor of *The Contemporary Music Review* and edited two issues dedicated to "Spectral Music," as well as a double issue featuring the collected essays of Tristan Murail. His book *Classical Music, Why Bother?* was published by Routledge. A CD of his chamber music was released by Universal Music/Accord. He currently teaches composition at Boston University.

Matthew GOODHEART is a composer, pianist, and teacher who explores a broad musical landscape, and is known for his experimental work. He lives in the San Francisco Bay Area. His music, from free-improvisation to traditionally notated chamber pieces, has been performed throughout the USA, Canada, and Europe. He has received numerous awards and released several CDs.

Rozalie HIRS studied composition from 1994 until 1998 with Louis Andriessen at the Royal Conservatoire, The Hague, Netherlands. From 1999 until 2002 she was a graduate composition student with Tristan Murail at Columbia University, New York. From 2005 until 2006 she taught the course “*OpenMusic* and Contemporary Compositional Techniques” at the Amsterdam Conservatoire in collaboration with the Nieuw Ensemble and the Royal Conservatoire.

David Gerard MATTHEWS attended Interlochen Arts Academy, received his bachelor’s degree in composition and musicology from Oberlin College Conservatory, and studied composition at the University of Pittsburgh. His teachers have included Mathew Rosenblum, Anne LeBaron, Richard Hoffmann, John Luther Adams, Pieter Snapper, and Randolph Coleman. In 2002, he attended the Internationale Ferienkurse für Neue Musik in Darmstadt. He has also been a composer-educator in residence with the Pittsburgh Chamber Music Society.

Paula MATTHUSEN is a composer living in Brooklyn, New York. She received her BM in Music from the University of Wisconsin, studying composition with Joel Naumann and Steve Dembski. Matthusen studied composition and electro-acoustic music at New York University, where she was a MacCracken Fellow, with Lou Karchin and Elizabeth Hoffman. She co-founded the performance-art ensemble 52 Splinters, and the Women Composers Concert Series. She performs with several ensembles.

Eve McPHERSON (MA Ethnomusicology, Tufts University; MM Vocal Performance, University of California, Santa Barbara) is currently a doctoral candidate in ethnomusicology at UCSB. She has conducted research on Islamic recitation practices, voice quality, and 20<sup>th</sup>-century American opera. Her work has been supported by UCSB, the Institute of Turkish Studies, the Foreign Language and Area Studies program, and a Fulbright-Hays Doctoral Dissertation Research Abroad grant.

Tristan MURAIL (born in 1947) received degrees in classical and North African Arabic and in economics, before turning to composition. A student of Olivier Messiaen, he won the Prix de Rome in 1971, spending two years at the Villa Medici. Upon his return to Paris in 1973, he founded the Itinéraire ensemble with a group of young composers and performers, including Gérard Grisey. In the 1980s, Murail began using computer technology to further his research into acoustic phenomena. This led him to

years of collaboration with IRCAM, where he directed the composition program from 1991 to 1997, and helped develop the PatchWork composition software. Tristan Murail is a professor of composition at Columbia University.

Brian O'REILLY is the creator of various works for live sound/moving images, and mixed media assemblage/installation. He plays double bass, focusing on the integration of electronics and extended playing techniques. O'Reilly has worked with Eliane Radigue, Luc Ferrari, Matmos, and Maryanne Amacher. He regularly performs and collaborates on projects with Curtis Roads, Garth Knox, Stefanie L. Ku, Zbigniew Karkowski, and Steina and Woody Vasulka.

Mehmet Can ÖZER was born in 1981. In 1998, he was accepted to Bilkent University's Composition Division with a full scholarship. He has trained as a composer and orchestral conductor. After his graduation, he was accepted to the Conservatoire de Genève and the Hochschule Musik und Theater Zürich. He won the Halıcı-Midi Computer Composition Competition, the Bourges Electroacoustic Music Competition, and the Goethe Institute Artists Award.

Tamara RAATZ, Associate Professor of Music at Eastern New Mexico University, has presented lectures and recitals in Vienna and Salzburg, Austria; the United Kingdom; Wellington, New Zealand; the Australian National University; and the International Clarinet Association Conferences. She holds degrees from Baylor University, the University of Michigan, and the Eastman School of Music.

Robert REIGLE earned his doctorate in ethnomusicology at the University of California, Los Angeles, and joined the MIAM faculty at Istanbul Technical University in 2002. He conducted ethnomusicological research in Papua New Guinea, living there for six years. His article on octave perception appeared in *Sonus*. He collaborates regularly with Iancu Dumitrescu and Ana-Maria Avram, and premiered works by them in Tokyo and Bucharest. Reigle gave the New York, New Guinea, Tokyo, and Istanbul premieres of Giacinto Scelsi's *Tre Pezzi, pour saxophone*.

Curtis ROADS is Professor of Media Arts and Technology at the University of California, Santa Barbara. His books include *The Computer Music Tutorial* (1996, The MIT Press) and *Microsound* (2002, The MIT Press).



His electronic music *POINT LINE CLOUD* won the Award of Distinction at the 2002 Ars Electronica Festival.

Michele RUSCONI is a Swiss composer whose musical outlook has been shaped by the study of Balinese gamelan, and many years of living in New York working as a jazz pianist. In 2003, she graduated in Freiburg, Germany, where she was a composition student of Mathias Spahlinger and Mesias Maiguashca. She lives in Basel, writes for ensembles, and composes tape music.

Pieter SNAPPER (born 1967) is an American composer and sound engineer. The Fromm Foundation, Memphis Symphony, and others have commissioned his work. He studied composition with Andrew Imbrie, Ralph Shapey, and Howard Sandroff. He has toured extensively as a performer of interactive computer music. His music is available on the Cristal and Gasparo record labels. Snapper teaches composition and Sound Engineering and Design at MIAM, Istanbul Technical University, and directs the MIAM Studios.

Tolga TÜZÜN (born 1971) is an electro-acoustic music composer living in New York. He received his BA in Political Science. He completed his master's degree in composition at MIAM, Istanbul Technical University, studying with Pieter Snapper and Mark Wingate. He also studied composition with David Olan, Tristan Murail, and Philippe Leroux. He is currently writing his doctoral dissertation in composition at the City University of New York Graduate Center.

Bert VAN HERCK (born 1971) is a composer of instrumental and vocal music ranging from solos to orchestral pieces. He studied at the Lemmensinstituut, Belgium, with Luc Van Hove. He participated in master classes with, among others, Jonathan Harvey, Gérard Grisey, Helmut Lachenmann, Wolfgang Rihm, Marco Stroppa, and Bogusław Schaeffer. In addition, Van Herck has studied privately with Luc Brewaeys.

Robert A. WANNAMAKER is a composer, improviser, music theorist, and mathematician. He holds PhD's in music composition from the University of California, San Diego, and in applied mathematics from the University of Waterloo. His music and research reflect his interests in the physicality and perception of sound, tuning systems, noise, gradual processes, and algorithmic composition.

Paul WHITEHEAD completed his doctoral dissertation on German Baroque instrumental music at the University of Pennsylvania. After graduating in 1996 he taught at Franklin and Marshall College and the University of Pennsylvania. He has been a faculty member at MIAM, Istanbul Technical University, since 1999, where he teaches Musicology and Music History and is Program Coordinator. He is also a harpsichordist and *basso continuo* player.

Kathryn WOODARD is a pianist and scholar who specializes in new music. She has performed with the Shanghai Quartet, eighth blackbird, and Allen Otte of the Percussion Group Cincinnati. She is Assistant Professor in Music and Performance Studies at Texas A&M University. Her research on the Turkish composer Ahmed Adnan Saygun led her to serve as a consultant for Turkish music with the Silk Road Project.